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ABSTRACT

This document consists of three issues of the journal "Seedbed," an outcome of the Teachers' Center Project at Southern Illinois University at Edwardsville (SIUE). Issue Number 29 contains 67 articles on teachers' ideas that they thought worth sharing with other teachers. Issue Number 30 consists of a single paper, "Children and Mathematics in the Land of the Giant Panda," by Andrew M. White, which describes a teacher's perceptions of the Chinese educational system obtained during a 3-week visit. Chapters are: (1) "Introduction"; (2) "General Observations and Impressions"; (3) "Education"; (4) "Themes in Chinese Society and Education"; (5) "Structure of Education"; (6) "Welcome to the Pre-School"; (7) "Primary and Middle Schools"; (8) "Mathematics Curriculum"; (9) "Children's Palaces"; (10) "Teacher Preparation"; (11) "Summary and Conclusions"; and (12) "References and Bibliography." Issue Number 31 contains 32 articles by SIUE students who visited British schools during the summers of 1986 and 1987. (YP)

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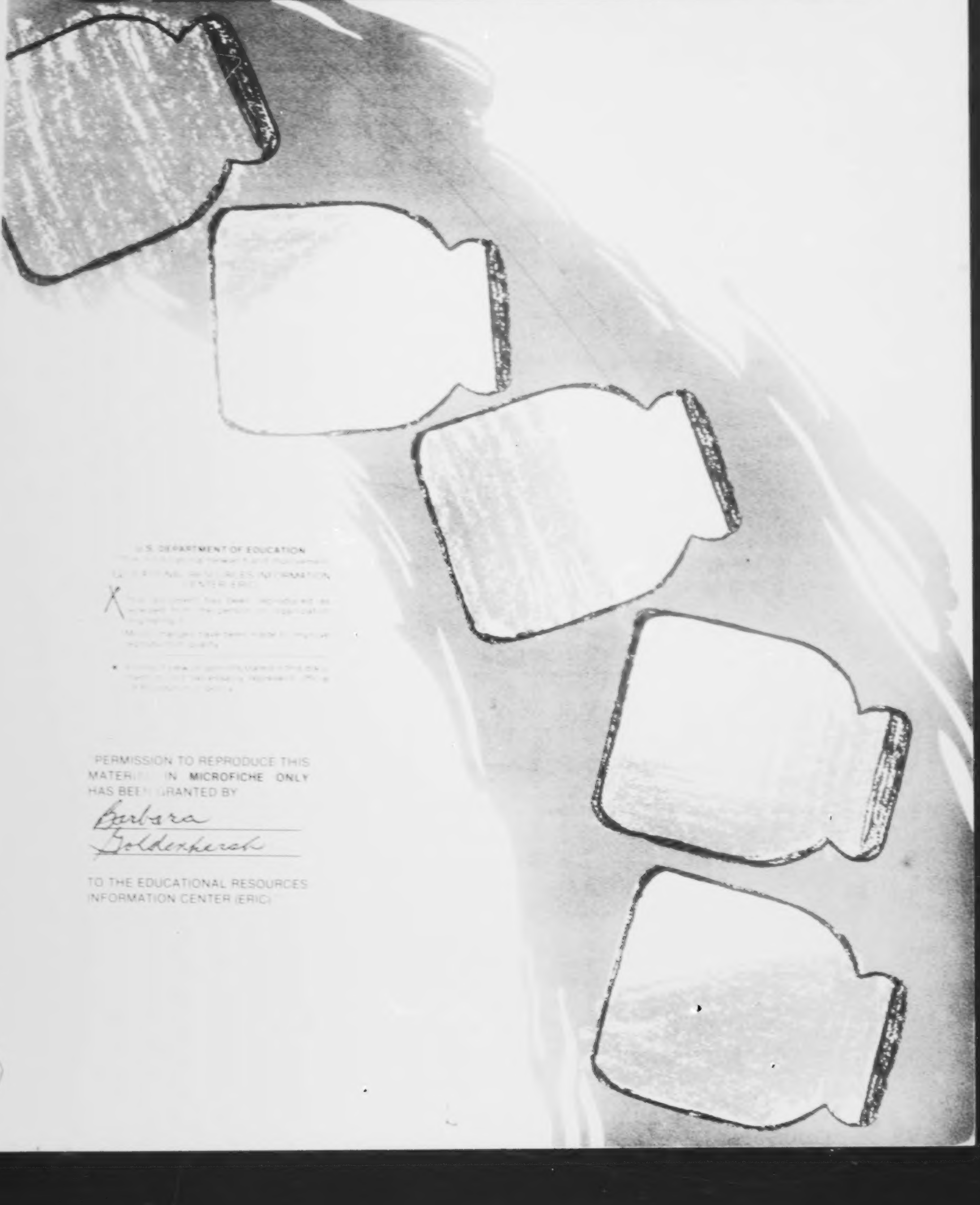

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SEEDBED

NUMBER 29

FEBRUARY 1988

Teachers' Center Project

SIUE

Southern Illinois University
at Edwardsville

INTRODUCTION

We are pleased to bring you issue 29 on **SEEDBED**. We hope you will find on these pages material which you can put to use to help children to continue to be involved in their education and to grow through that involvement to their fullest potential.. Remember, as always, education is not a spectator sport.

As always, Dr. Thomas C. O'Brien is the main conduit to the thoughts and ideas which flourish in **SEEDBED**. Thanks must also go to Mary Steffen and Judy Barnett who have joined him in teaching many of the students whose articles you will find within.

SEEDBED articles are almost always written by Teachers' Center participants as a result of their investigations at SIUE. Why then does David Floyd of Leeds, England appear in the current issue? David is a Teachers' Center participant by adoption. As many of you know, Teachers' Center participants have spent part of their summer for each of the past three years working in British schools. David Lingard, visitor to the Teachers' Center and Head Teacher at Northcliff Comprehensive School, Conisborough, England, has been one of our hosts. David Floyd teaches with David Lingard at Northcliff and recently put in a year as a Fulbright Exchange Teacher near Washington, D.C. Needless to say, the immersion in American education was a bit of a shock to him. Tom O'Brien encouraged David Floyd to write up his experiences and observations and advised the editor of the American journal, The Principal, to publish them. What appears here is the work -- with a bit of British reserve -- that David produced for The Principal.

Barbara Goldenhersh

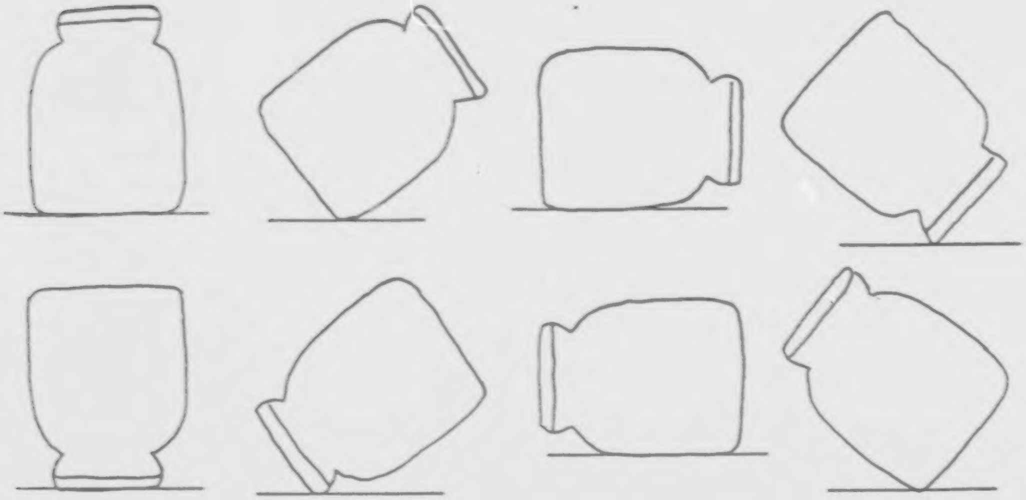
Barb Goldenhersh

Editor

ABOUT THE COVER

As many Teachers' Center Participants know, the "Tilty Bottle" childwatching task is incredibly rich.

Fill a bottle 1/3 full of colored water. Give the child the following pictures of the container and, holding the container in the proper position for each picture, ask the child to draw in the water as it appears to him or her.



This childwatching task yields particularly striking results. The cover shows a few pictures from the present Teachers' Center session presented in developmetal order.

Aside from the shock value of what children produce (and say), there are several important lessons for teachers.

Perhaps the most important is that the mind is not a camera. The drawings the children produce represent water-bottles they never could have seen in earthly reality. What happens -- with all of us, not just children -- is that the mind acts on reality in terms of its existing networks. It does not, as we do often pretend as teachers, copy and store reality.

Another aspect of the "Tilty Bottle" task is conservation, the judgement that certain aspects of the situation remain invariant over transformation. What do children see as invariant at various ages?

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CONSERVATION OF DISPLACEMENT -- VOLUME

Lori Gaffner

I had worked with a particularly bright seven-year-old on previous tasks and decided to take her through Piaget's conservation tasks as outlined in Ed Labinowicz's book, **THE PIAGET PRIMER**.

We began with conservation of number. I set out two rows of ten chips, one row of red and one of black. I asked my seven-year-old (who I will call Carrie), if there were the same amount in each row. She said "yes". I then pushed the red row closely together.

"Are there still the same amount in each row?" She quickly answered, "Yes, of course. It will be the same unless you take some away or add some." I decided she was a conserver of number, and moved right on to the next task, conservation of length.

I took two strings of equal length and layed them on the table side by side. Carrie agreed they were the same length. I then took one and curved it, in an "S" shape. "If a worm were traveling along these strings, would he have farther to travel on either one of them?" "No", Carrie replied. "They're still the same length. You just moved one of them." And so, on to the next task, conservation of liquid.

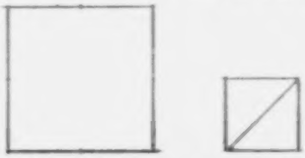
I took two short, wide glasses full of equal amounts of water, and poured one into a tall, thin glass. "Do these two glasses have the same amount of water in them?" "Yes." "They do? Tell me why you say that."

"Because these two - the one that you poured it into is a different size than the other one, it will hold just the same. But since it's thinner, it will go up higher." "If you were really thirsty, which glass would you rather have?" I asked. "I would pick either one because they both have the same amount.

"Next, we went on to conservation of substance, or solid amount. I took two balls of clay of equal size and rolled one, stretching it out. I asked Carrie, "Which is bigger?"

"They're both the same, because when you rolled them into balls they were the same. When you roll one into a hot dog it's not going to be any different. It's still the same amount of clay.

"For the next task, conservation of area, I had cut out a square and two triangles.



I told Carrie I wanted to plant a garden. At first, my garden (the triangles) was going to be in the middle of the grass (square), but then I decided to put it at the bottom of the grass. "Will I still have as much room for planting?" I asked. "Yes, you will. It's still the same amount, it's just a different shape." "So I will still have as much room for planting?" I asked again. This time she wasn't as sure. "I think you can do pretty much the same. You just turned the triangles around, didn't you? But they'll still take up the same amount of space, I think."

I concluded with conservation of displacement - volume. For this task I used pill bottles of various sizes, pennies for weight, and two tall, thin glasses with equal amounts of water. We compared six pairs of bottles. Pair one - same size bottle, same weight; pair two - same size bottles, different weights; pair three - same size bottles, different weights; pair four - different size bottles, same weights; pair five - different size bottles, different weights; and pair six - different size bottles, different weights.

For each pair, we would place one bottle in the glass and I would have Carrie predict where the water would come up to in the second glass when we placed the other bottle in it. On pair one - same size bottles and same weights - Carrie immediately predicted that, after placing one bottle in the glass, the other water line would be the same because the bottles weighed the same. She was not surprised to find that her prediction proved to be correct. So far, the task was fitting into her mental structures - weight was most important, and in this case, it happened to work. In the others, however, it didn't.

With pair two - same size bottles but different weights - Carrie also immediately predicted that the heavier bottle would cause the water to go up more. We placed the lighter bottle in first. When the second bottle was lowered into the water and the water line was the same as the first, Carrie said, "It doesn't matter what the weight is? That's weird. I've never had that happen to me before.

Pair three - same size bottles, but different weights - was the same as pair two. We placed the lighter bottle in first, and Carrie predicted this time that the other bottle would cause the water to go up the same. "Why?" I asked. "Because that's what happened with the other one." She was not surprised to find that she was correct.

The fourth pair - different size bottles, but same weight. This time Carrie said, as she was predicting, "They're different shapes, so they're going to go up different heights. Actually, I really do think they are going to go up the same because they weigh the same." After putting both bottles in, Carrie said, "Oh, they went up different amounts because they're different shapes. I was right the first time."

Pair five - different sizes and different weights, the heavier one was smaller. We put the bigger one in first. When I asked Carrie to predict, she said, "It will either go up higher or lower, not the same. But I'm not gonna say which." She wouldn't commit herself this time. I asked her why the smaller one was lower, and she said, "Because they were different shapes? I thought it would be higher because it had more pennies in it."

Pair six - different sizes and different weights as well, but the heavier bottle was also the larger bottle. This time Carrie predicted the larger bottle would cause the water to go up higher because of "the shapes."

By the end of the task, Carrie was aware what she had thought to be true (weight is most important) was not, but she still wasn't willing to commit herself totally to the new concept that size was most important (or rather, volume). She had made some changes, but she was inconsistent. She appeared to be in transition, and in a state of disequilibrium. I think she may have been ready to work further on this task and may have soon reached equilibrium and been a conserver.

A TALE OF TWO CULTURES: A LOOK AT THE U.S. ELEMENTARY EDUCATION FROM AN ENGLISH VIEWPOINT

David and Brenda Floyd

David Floyd is a Fulbright Exchange Teacher from Yorkshire, England. Since August 1986 he has been teaching history at Potomac High School, Byon Hill, Maryland. David has taught for 16 years in three different high schools in England; for the last five years he has been an assistant principal. His wife, Brenda, has taught for five years in both elementary and high schools. Before coming to the U.S.A., she was chairman of the Board of Governors of her local primary school.

"Hi, how yawl doin'? Can I have my birthday party at McDonalds?" "I'm not not sure," I wearily replied to my ten year old daughter. "Nicholas (my 12 year old), please can I use the phone, you've been talking to Shaun for the last hour and a half." "That's real awesome," interrupts Jeremy (my 6 year old), as he watches the ninth commercial in the first five minutes of Transformers, "can I have one?" "We'll see", "Dad, you're real neat." Was this the culture shock we had been warned about? Three months and they'd completely forgotten their English heritage. To think, back in the U.K. we had worried about how our children would cope with the demands of life in the U.S.A. Children are far more adaptable than we ever give them credit for; and in our case we worry that they have adapted too well.

Now as we enter the ninth month of our Fulbright Teachers Exchange, it is time to reflect on the differences between the education our children received in Yorkshire, England and that offered in Prince Georges County, Maryland. We have been extremely fortunate because all our children attend good schools, both in the U.K. and U.S.A. They seem to reflect what each country regards as good practice. Both schools also share the same common denominator for success: a highly committed professional staff. From our point of view, it has been fascinating to see how the same volume of energy and skill can be channelled to produce very different educational experiences.

Perhaps the first and most obvious difference to confront our children was the pace of American education; it is much faster. Reared on an English diet of a 20 minute break in the morning and the afternoon, as well as 1 hour and 15 minutes for lunch, our children still find a single 30 minute recess for lunch hard to bear. Total time on task is probably the same but the time to relax, socialize and release all that pent up childhood energy seems strictly rationed in the U.S. We still question whether this frenetic pace is justifiable from an educational point of view. In a practical sense, good bladder control seems an essential part of a 6 year old's survival kit in the U.S.A.

My daughter loves being on bus patrol but finds it hard to understand why she has to catch a bus in the first place. In Yorkshire we live farther away from school, but, come hail or come shine, like all the other children who attend the school, they walk. Our children are not as physically fit as they used to be! A few judiciously placed sidewalks might relieve the problem and be a sound investment in economic terms. The ease of getting to and from school also probably explains why our U.K. primary school is able to offer a rich programme of extra-curricular activities. From art, crafts, music, chess, science through to the major sports of rugby, soccer, cricket and netball, our children are offered a wide choice. Unlike some of their U.S. counterparts, U.K. teachers are not paid for these extra duties and, despite dwindling real incomes, continue to give of their time willingly.

A more fundamental difference lies in the sphere of the curriculum, its objectives and its content. In the U.S. the emphasis seems to centre upon the transmission of factual knowledge and concepts. In the U.K. the emphasis is much more on the process of acquiring knowledge and, more importantly, skills. This is well illustrated by comparing my daughter's science lessons: in the U.K. science equals conducting experiments, formulating hypotheses and testing them, i.e. thinking scientifically. Last year her class tested 4 substances to see if they could persuade worms to come out onto the surface. Each group was given a square metre to rope off and to apply a particular substance; they then counted the number of worms which appeared. Interestingly dishwashing liquid was found to be the best solution (fishermen please note!). Science in the elementary schools in the U.S. seems to be answering questions out of a science book. This anecdote also illustrates another fundamental difference: our U.K. school places a greater emphasis on concrete experience as the basis for all meaningful learning. In math, when my daughter was 6, she learned all about isosceles triangles. A workman, in the process of removing some paving flags from inside her classroom, broke some. The class promptly decamped and spent the rest of the morning exploring the relationship between the triangles, rectangles, and squares using the broken and unbroken flags. It is no wonder that, despite having the dual handicap of innumerate parents, all our children love math. Somehow the U.S. emphasis on rote learning, repeated practice, and dittoes doesn't seem as much fun. The reason for this difference is not hard to define: the prime objective of U.S. math is functional numeracy and anemonic rules, and quick fixes are probably the most efficient way of achieving this. The U.K. aims to teach children how to think mathematically and many teachers would argue that the calculator/computer evolution has considerably reduced the importance of rote learning. The saga of the paving flags also illustrates a difference in approach to the local environment. In the U.K. our children frequently go out into the immediate locality: a visit to a brick factory, a coal mine, a nature walk, a traffic census have all been a part of their staple diet. The mundane and everyday are made to seem valuable and, at times, spectacular. As yet neither of our two elementary school children, have been out on a class visit anywhere. Their experience remains essentially second hand, from textbooks.

The approach to language work is radically different in the U.S.A. where the ability to write grammatically correct english is the prime objective. However in the U.K. it is more important that children are encouraged to write creatively; to experience first and foremost the pleasure of the well crafted phrase or stanza, rather than the inhibition and boredom of knowing when or when not to employ a pronoun as a prepositional phrase. Undoubtedly our two oldest children have struggled in the sphere of functional literacy. Their spelling has improved markedly but in proportion to the decline in their desire to write. We feel that there is no simple solution to this vexed problem but the answer may lie somewhere in the middle of the Atlantic, between the two systems.

The desire to nurture intrinsic interest lies more to the forefront in English primary education; methodology is rooted upon this foundation. Our children are used to spending some part of every day, researching and writing about a topic of their own choosing which usually relates to the broad theme which the class is currently studying. More often than not the outcome may be a painting or a three dimensional model. Indeed the creative arts play more of a central role and are bound up with the desire to provide a concrete medium for learning. Drama and music are seen as important vehicles for promoting both creativity and self confidence. Twice or three times a year the school presents a play/concert for the parents and the community; virtually every child in every class participates in each magnus opus which is often the summative expression of a major theme being studied during a semester. They are always extremely enjoyable and often highly amusing: as parents we miss them enormously.

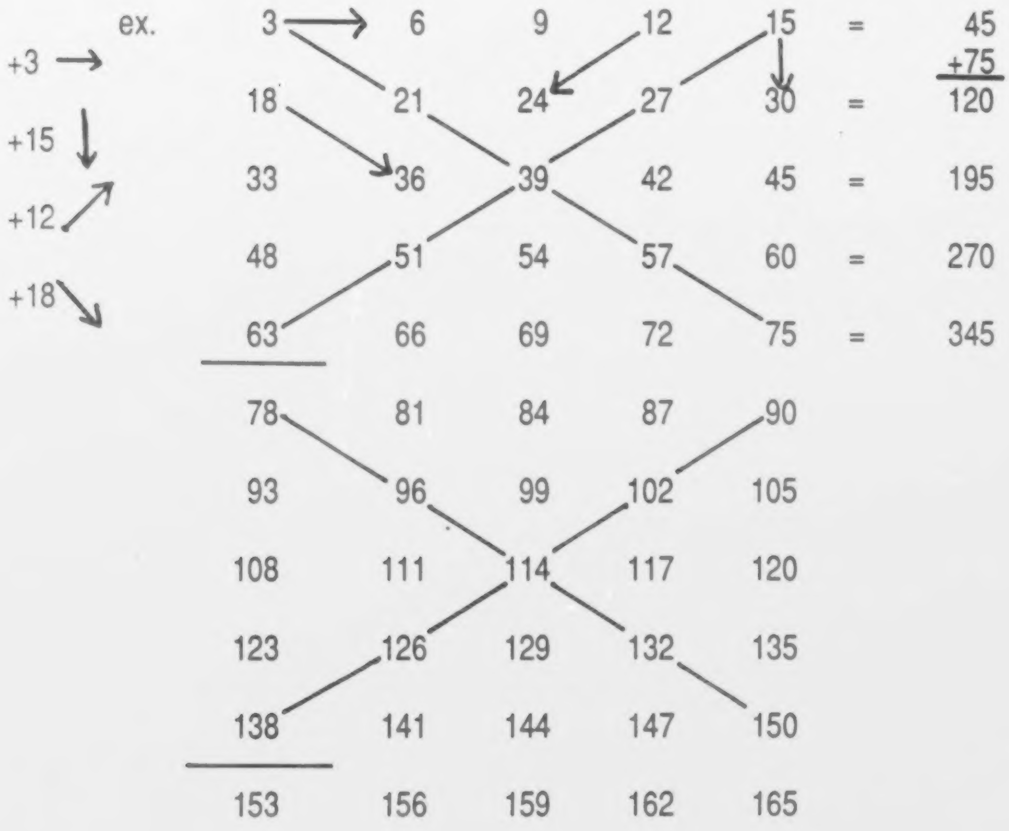
During topic work it is seen as crucial that the child initiates his own learning and takes responsibility for it: the teacher is the guide, not the source of all the answers. We feel that this approach has a beneficial effect behaviourally. Children in the U.K. are given far more freedom within the classroom and around the school generally. This seems to be rarely abused and probably explains why our children chafe at being escorted from class to class in silence at having to carry green passes, etc. As they move in silence down the hallways they are reminded of another overt difference; the walls in the U.S. are used, almost exclusively, to display children's work. Primary teachers spend hours mounting and displaying work in order to give publicly visible recognition to all children. Every available wall space, both in and out of classrooms, is covered with childrens' writing, poetry and art. This not only provides positive reinforcement, it also de-institutionalizes the atmosphere around the school and creates a sense of personal commitment to the fabric of the building. Reinforcement in the U.S. seems to take the form of a personal physical reward such as a note, or occasionally candy or a small toy. Although the intention is highly laudable, such tactics seem slightly dubious to a U.K. teacher. It could promote a rather instrumental, mercenary attitude towards learning viz "I'm not going to do this until I know what its worth" or "if there's no grade/candy at the end, then why bother?" Learning for its own sake, for its intrinsic worth seems to get lost somewhere along the way. A word of public praise in a school assembly, the display of some of your work in a hallway, seems to be enough for most English children. However we do welcome the frequent feedback we get on our children's progress. Reports four times a year are a luxury we've never experienced before. Indeed our children have never been tested or graded as much in their life. There is no such thing as the Honor Roll in U.K. primary schools. If children are compared formally and publicly, it is usually on the basis of effort rather than ability. Teachers seek to promote a cooperative learning environment rather than a competitive one, one in which the individual dignity and self worth of each student is actively safeguarded. Yet even if we question the value of what is tested, we applaud the discipline of learning which a regular system of evaluation imposes.

It is difficult in an article such as this not to create the impression that one system is somehow objectively superior to the other. That we find the English system personally preferable is more due to philosophical and cultural considerations than mere patriotism. Ultimately we believe that learning at the elementary level should be enjoyable, intrinsically rewarding and sustaining, creative and self realizing. Having said all this, our own children have gained enormously from the concrete experience of a year long field trip in the U.S.A. Quite whether they'll ever be able to adjust to life without grades, school buses, free local telephone call, and above all, McDonalds, remains to be seen.

MULTIPLES OF 3
Jeanne L. Wright

The advantages of working with number charts are endless. First, it allows children to be more in tune with number relationships. Second, the children start discovering patterns of their own. Lastly, children transfer this thinking to other forms of math computation.

1. My students and I drew a 3 X table as follows. Look at the patterns we found! This pattern is still effective when using consecutive numbers or multiples.



+3 →
+15 ↓
+12 ↗
+18 ↘

ex.	3	6	9	12	15	=	45 +75
	18	21	24	27	30	=	120
	33	36	39	42	45	=	195
	48	51	54	57	60	=	270
	63	66	69	72	75	=	345
	78	81	84	87	90		
	93	96	99	102	105		
	108	111	114	117	120		
	123	126	129	132	135		
	138	141	144	147	150		
	153	156	159	162	165		

What other arrangements for a 3 X table are possible? What patterns? What do other tables (4 X for example) yield?

2. Another pattern we found dealt again with multiples of 3's, the ten's digit in each decade will repeat 3 times unless the decade starts with a multiple of 3.

ex. 72, 75, 78 (3 times)
81, 84, 87 (3 times)
90, 93, 96, 99 (4 times)

What happens when the number changes into the hundreds place?
162 = 1 + 6 + 2 = 9

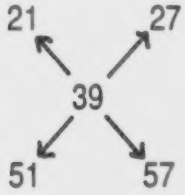
Reversing the order of the numbers in a 3 X table will give another number found in the table.

ex. 78 = 87
39 = 93

What about three digit numbers?

3. Diagonals in any square on a 3 X table will add up to be equal.

ex.



SOMETIMES A SHINING MOMENT

A review by Susanne Richter

Each time I read one of the Foxfire books by the students of the Rabun Gap High School, Rabun County, Georgia, I wanted to read more than an introduction by their teacher Eliot Wigginton. This book gave me that chance. Wigginton's positive attitude about teaching, his understanding of students, and the unique classroom experience he offers has made me anticipate each of the Foxfire books even more.

SOMETIMES A SHINING MOMENT is the autobiographical account of a teacher frustrated by student apathy, stilted curriculum, and his own sense of failure. Eliot Wigginton's first year of teaching was similar to many other beginning teachers' first year. He was distressed by the lack of enthusiasm and commitment to the class by most of the students. He felt he had to involve the students in the classwork - take away the rote and replace it with the student ownership of the class.

He began to change his classes with a magazine called Foxfire. His idea was to create a medium to teach the basics of English, expose the students to the rich heritage of the Rabun Gap area and cause his students to be actively involved in the class. What evolved from this classroom magazine was twenty years of the Foxfire Magazine and eleven books. The Foxfire is a classroom experience and was never intended to be a financial success. More important was the way in which Wigginton could use what he knew about how students learn to help them reach autonomy. In fact, he was able, at one point, to take a sabbatical leave to earn his Masters Degree and leave the Foxfire in the control of his students. Throughout the book, Wigginton speaks to teachers about helping students to learn how to take responsibility in the classroom and to allow them to act responsibly.

Wigginton has written the book in three parts. The first is his account of the Rabun Gap schools and the evolvement of the Foxfire Magazine. The second part is an exciting and thought provoking challenge to teachers to examine their teaching philosophy and methods.

The following quotations from the book give an overview of Wigginton's powerful teaching philosophy.

"...we and our students must understand how the world works. A curriculum composed of a toothless excuse for a civics course, a deadly American history course, a biology class in which students never go outdoors, an English class in which students write about their summer vacations, and a couple of mindless, empty electives will simply not fill the bill. Not in an age like this one. It's stupid and potentially catastrophic. As Carl Sagan said, "Any retreat from thinking is a prescription for disaster."

"As a direct result of our work with them, students should acquire rock-hard belief in their individual self-worth and potential. This does not mean that they should never experience failure or disappointment. It means, instead, that failures and disappointments should come honestly, not as a result of a teachers' punitive streak, and then, in an atmosphere of caring and concern, should be worked through to lead to that triumph that promotes the necessary willingness to take on something else without fear, and keeps alive and intact the student's sense of self-esteem and self-confidence. From the wellspring of such beliefs in self, our students acquire the courage they must have for tomorrow."

"Students should leave our schools with a sense of curiosity and wonder that propels them into an increasing dialogue with the outside world. Rather than being so disenchanted with the learning process that they shy from the active acquisition of knowledge ever after, they should not only have learned from us how to learn independently but they should have acquired an active desire to do so. They should be eager to stretch themselves further, thanks to our sensitive initiation into the learning process."

"Students should have been involved in enough projects and activities to have developed a familiarity with the need for and the mechanics of planning ahead, and they should have the ability to see beyond today and the immediate gratification into tomorrow. They should have a sense of patience combined with a sense of persistence, as well as the beginnings of a sense of vision of what their future could be and how to proceed toward it with the knowledge that had derived from their accumulated experiences. They should know the absolute futility of living for the moment, having experienced the intense pleasure of seeing some major work come to fruition after months of effort and planning; and yet they should also know how to enjoy and get the most out of any present experience. They should be alive and forward-looking; excited, but tempered in the best sense of the beginnings of wisdom."

"You want us to get those state and national test scores up? Fine. But be aware of one final thing. Most of what those instruments test is material that students can learn by rote and that we can cram down their throats through constant and unrelenting repetition. It's not that tough to do, and we'll make lots of workbook and computer software manufacturers wealthy in the process. The test scores will go up. But don't be deceived into thinking that any real learning has taken place. What has happened is that more students have acquired perhaps greater proficiency in some basic skills. That's all to the good, but those skills should be just a prelude to the education that should be taking place. When the test scores go up, and you relax your guard and sit back, know that you have settled for far less than our mission demands - if our mission, in fact, is education."

"Teaching basic skills and life survival skills, showing how the world works, fostering involvement in an appreciation for the arts, building personal traits such as curiosity, self-confidence, independence, and self-esteem, and simultaneously moving the student beyond self into a caring relationship with humanity and the environment and a sense of the interdependence of all life - a big job indeed. But those are our stated goals. ...Come on. There it is. That's our job."

THE CALIFORNIA CHALLENGE

Debbie Hefferly

Recently, the state of California rejected nearly 150 math textbooks and student workbooks submitted for use in California classrooms. The reason for this is that California wants a math curriculum different from the usual "rote and rules" approach. California's intentions are to provide a math program which allows the students to learn how to think about their math problems and apply math logic to everyday life.

Several ways have been suggested to develop the new and better approach. One method is for teachers to use more math manipulations -- aids such as blocks, Cuisenaire rods, and bead strings that make math a hands on experience, not just a literal one. The thing that is most important for this "new" approach to succeed is that attitudes toward math must change. Students and teachers must have a positive attitude. Attitudes that encourage curiosity, individuality, experimentation and conjecturing must be there for a new math approach to take hold.

As California sends the publishers back to the drawing board to develop a new math approach, we can only hope they will improve our math textbooks and teachers everywhere will be willing to use different methods in order to develop in the children the desired "higher-order thinking skills."

IS IT LEARNING OR ROUTINE?

Pamela Bell

Throughout my classroom observation it was fascinating to watch how children develop their own approach to learning. It was also interesting to watch my teacher present the materials. I wanted to ask her if she has ever noticed how children act when they are doing their assignment. From what I saw in her room I don't think she was aware that the students used their own decoding skills regardless of how she instructed it to be done. However, I did notice that the children seemed programmed to the routines. They responded to the routines like mechanical robots.

Example: Good morning teacher - Reading & ditto worksheet - P.E. - Math books and workbook - Lunch time - Gym - Recess and Home time.

Not too many smiles or complaints; she was in control of her methods of learning. I don't know about them but if I had spent one more week in that class room, I would have become powerless. There was one student who did not appear to be programmed. She disrupted the whole program. She never turned in her assignments, she has to give up her free time and recess because she seemed too bored with the routine. Something has to be done about her because she can do the work, she is just lazy. Or, is it possible she is not motivated because she needs more challenging experiences?

Concepts are best developed through direct experience. Teachers often have difficulty in really motivating children because they depend too much on the textbook and using ditto's which provide indirect experience and symbolic presentations of concepts which tend to present new terminology before students are able to learn it.

REFLECTIONS
Pat Hays

Learning is a constructive process which develops from the internal processes of an individual as he responds to external situations.

Each person must construct his own knowledge or faith. I cannot transmit my knowledge or faith to my own children, to my classroom students, or to any other individual.

I can present situations and teach skills but each individual must approach the situation and apply the skills according to his own understanding and development.

Learning involves the coordination of several different classes and is just as much an active process as learning to ride a bicycle.

Almost everyone moves from the concrete in understanding to the abstract, and thus a child's counting on his fingers is just as appropriate as a new driver learning to drive a car with an instructor and an actual car.

Each person has a right to make mistakes and to be wrong is just another step in learning. As a teacher, I can study the mistakes of my students to see where they are in relation to where they are going.

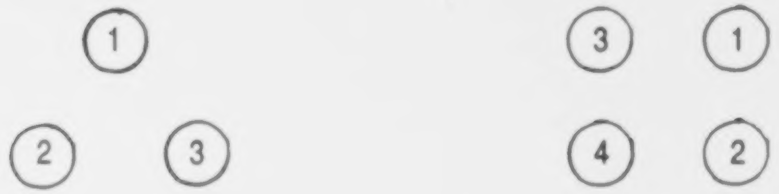
The individual needs control over some of his immediate surroundings. When an individual has no control, than he must take some control, either appropriately or inappropriately, in order to reach some state of equilibrium.

As a teacher, I cannot guarantee that every child will have an enjoyable classroom experience because, like so many other external environments, it depends on previous attitudes and experiences. However, I can make the atmosphere as pleasant as possible, remember that each child is an individual, and give the student an opportunity to construct his own learning.

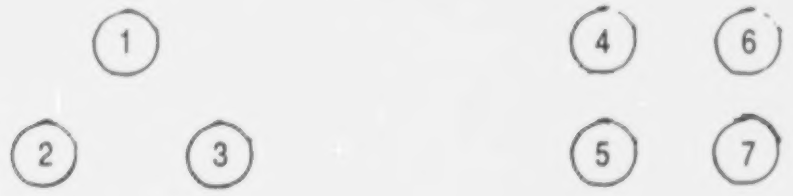
DOES THREE PLUS FOUR REALLY EQUAL SEVEN?

Marcia Anderson

The child watching exercise, does 3 plus 4 really equal 7, was my favorite. I chose Danny as my subject because his answers are so original. He had 20 chips to work with. I asked, "Danny, using these chips, show me how 3 + 4 = 7." He proceeded to move the chips and came up with this:



Then he stated: "Here is 3 and here is 4 and there is 7 all together.



I asked him if he could come up with another way of doing this. He said, "Ok, here is another way, look!" What he showed me was this: 3 in his hand, and 4 spread out randomly on his desk. He said, "Just because they are not laid together doesn't mean they don't equal 7." He proceeded, "You can take 3 out into the next room and leave 4 in here and they will still equal 7."

MONEY GAMES
Judith Jackson

Ask a child what mathematics is. Answers may vary depending on the age of the child, but chances are, the answer will be strictly academic. Rarely will you hear words like "fun" or "exciting" to describe math. Math, to them, is the calculations that take place in a classroom and many children do not consciously relate to the term "mathematics" outside the classroom.

Yet many of the "fun" and "exciting" activities for children involve numerical thinking. Most of the games children play involve keeping track of "how many" turns, moving an object "so many" spaces, counting the dots on the dice and keeping score.

By the time a child is eleven- or twelve-years-old, most of them have some experience in applying mathematical knowledge in a very practical manner--handling money. Whether the money is given to them, earned by them, spent freely, put in a savings account or tucked safely in a shoebox under the bed, they all take an interest in it. Combining their interest in money with the fun and challenge of game playing is a great mathematical tool.

Money games are obviously enjoyed by children of all ages judging from the enduring success of Monopoly. Monopoly is a very sophisticated money game that many children can play with a great deal of proficiency by the 6th and 7th grade.

Another money game that can easily be adapted to the classroom is playing the stock market. This game can be scaled down for 6th grade level children or can be elaborated on for 7th and 8th grade students.

You may begin by briefly discussing what the stock market is. You might tell the class that when they buy a toy, go to a movie, eat or drink, they are helping a company "make money". A person can buy an interest in, invest in, or buy a share in the company (use the terminology suitable to your grade level) and by doing so, a person can share in the money that company makes - or loses - as the case may be.

There is no need to try to be a financial advisor and you may want to keep your explanation simple. Dividends, stock splits, puts and calls, round and odd lot trading facts, and buying and selling on margin are some of the facts that should be eliminated from this game. There is no need to buy a Wall Street Journal, as most city papers have a financial section that will give you daily trading information.

Choose a list of stocks trading in companies that the children will easily recognize. Make a sheet with information they will need in choosing their stock. The following is an example taken from the daily trading on the New York Stock Exchange:

Past 52 Weeks			
high	low		Current Price
65 7/8	47 1/8	Kraft	58 1/2
15 1/2	7 3/4	Mattel	11 3/8
35 3/4	24 1/2	Pepsi Co.	34 1/8
85	55 3/8	McDonalds	80 1/2
60 3/8	39 1/8	Wal Mart	54 1/2
68 1/4	35	Disney	64
68	43 1/4	K-Mart	60
20	8 1/4	Coleco	10 3/8
30	21	Hersheys	25 1/8
49	32 7/8	Coca Cola	41 1/4

By giving them the high and low trading information for the past 52 weeks, the children can see how well that stock has performed in the past. I've eliminated dividend information and high and low trading for the day.

You may want to tell the class that each of them has a $1,000.00 limit in which to invest in the company or companies of their choice. You may also want to restrict their purchases to a minimum of five shares of any one stock.

With the above information, allow each child to figure out how many shares of stock they can buy without exceeding their limit of $1,000.00 and have them keep a record of their transactions. Stock certificates may be made up to issue to each student. The class may want to form investment groups of four to six students to compete with other groups. Perhaps once a week, the students may want to check their stock to see how much they have made or lost. Encourage averaging gains or losses in multiple stock purchases.

A 6th grade class may be content to choose their stocks and stick with their decision until it is time to sell, but an 8th grade class may want to trade on a weekly basis.

Your class might also enjoy a project involving keeping a check book. Make photocopies of a personal use check book ledger and tell the students they are to pretend they are now living alone and that they earn $1,000.00 (clear) each month. Have them deposit that amount in their check book and make entries representing a month's expenses. Give them several days to work on this project at home. Give them a list of things they will need to pay each month such as rent, auto lease payments, food, transportation, clothes, utilities and entertainment. A newspaper will give them apartment rental rates and auto lease rates, food and clothing prices. Parents will be able to furnish other information they will need.

That $1,000.00 may seem like a lot of money to an eleven- or twelve-year-old - until he finishes his project. It will be interesting to find out how many are able to "live" on their earnings.

Combining classroom mathematics with real world economics is perhaps one small way in which you, as a teacher, can inject more interest in children applying their numerical problem solving skills. Education is to prepare one for life today and tomorrow. Thus, an additional element in these games is to provide to the child, a basic introduction to the economic structure of the Western industrialized world and preliminary elements of financial planning.

TEDDY BEAR MONTH
Barb Brackman

I want to share with you my remedy for helping the February blahs pass more quickly. In my room, February is "Teddy Bear Month". I know, "big deal", right. Well it can be. Using teddy bears as our theme of the month, everything we do revolves around our cuddly friends. Adding and subtracting is a lot more fun when it's bear friends we're adding. Suppose as part of the celebration we have a party for our bears, haul out the food section of the local paper and make a shopping list. Now we can practice counting money and making change. Once we've got our groceries we have to prepare our food. Pick out simple recipes and let the children use (and really experience) what a quart is or "how much is a teaspoon?" We can go into classification, the different colors of bears, eyes, how many different kinds of bears we have, the list is endless. Of course, there are all kinds of other activities involving reading, writing and lots more math activities. Let your imagination go and I guarantee the month of February will fly by "unbearably" fast.

CONSERVATION OF NUMBER -- WHAT IS "MORE"?

Lori Gaffner

I chose to use one of Piaget's conservation tasks dealing with conservation of number for a child-watching experience. While working with four-year-olds, one young girl's responses were particularly interesting to me.

I began the task by placing one row of six red chips on the table in front of us. I asked the girl to count the chips for me. This proved to be a somewhat difficult task for her, as she lost her place and had to start over several times. Finally, she confirmed that there were six chips. Next, I placed a row of six black chips directly across from the six red chips. I asked her how many black chips were there. She proceeded to count each of the black chips and finally answered, "six".

I asked, "Is there more of one color than the other, or are they both the same?" She looked confused. So, we counted the rows together, matching one red with one black, until we had all matched. Again I asked, "Is there more of one color than the other?"

"No", she replied. "They're both the same."

I then spread out the black row, and asked, "Are they the same number now?"

"No, black has more because it's higher. It got moved up." She was referring to their placement on the table.

I asked, "Are there more black chips than red chips?"

"No, it's still the same amount, but it's higher."

"Are there more black than red?" I asked.

"Yes, there are more."

In this task, what did "more" mean to this four-year-old? At one point she told me that black still had the same "amount" as red. Had she really conserved the number of black and the number of red? She did tell me that they were the same "amount", but when asked if one was "more" than the other, the answer was different. Perhaps black was "more" because black took up more space on the table. This four-year-old had not achieved conservation of number, but she had made significant observations.

THE WAR ON EDUCATION

Julie Howell

I just turned the television off after watching another depressing news show on how poor the U.S. school system is. I don't deny that our schools need improvement. In fact, I would be the first to suggest it, but I am tired of hearing about it; I want to do something about it! I feel it is time for the parents, the teachers and the administrators to quit playing games and get down to the basics.

I used to think that Japanese schools really weren't any better than ours. I used to think there was too much pressure put on the Japanese students to succeed. And I used to think that the Japanese were not very creative. At first, I was satisfied with these weak arguments as to why the schools in Japan were so much better than U.S. schools. Not anymore.

I still feel that too much pressure is put on Japan's students to succeed because Japan's suicide rate is almost twice our's at the elementary school level. On the other hand, I have heard an awful lot of talk in the U.S. about going back to the basics. The basics in this case is rote memory of reading, writing and arithmetic. I would like to meet these people who believe rote memory is the best and ask them to memorize nonsense words and test them on it 2 weeks later.

To children, most of what we do in the schools is like nonsense words. We as teachers, parents and administrators don't take the time to make sense of what we teach. I did an experiment in a fourth grade classroom of average students who knew their multiplication facts inside out. I asked them to write a word problem depicting 6 X 7. Out of 18 students, only 7 got it mostly correct. Out of those 7, only 3 got it completely correct, and those 3 all used a case (as in a case of books, soda, etc.) to describe 6 X 7. This tells me that the students don't know what 6 X 7 means, but they sure can spit the answer out. Learning is not simply absorbing information; it is taking information, relating it to experiences in the world, and making sense of it.

In this same fourth grade class I sent home a single math problem as homework. This math problem included measuring, using a legend on a map, adding and figuring up how much gas a car getting 20 miles to the gallon would need to go between 2 points on a map. This was a lot of work for these students. The parents of several of the students got upset because they couldn't see spending a lot of time on one problem; they couldn't understand why I didn't just make a ditto of 25 problems and send it home. I was trying to let the children see why it is important to know these different functions, and how they would use it in the real world. If I wanted answers spit out at me I would sit in front of a computer, not 25 children.

Another area that interests me about the students in the U.S. is their parents. In the U.S., if Johnny can't read, it is the teacher's fault. In Japan, parents take much more responsibility for their children's education. They don't work against the teacher and they don't blame the teacher. In the U.S., school has become a babysitting service for working parents. I've heard many parents say that if schools were like they were 50 or even 25 years ago, students would learn more of "the Basics". I say if parents were more like the parents of 25 or 50 years ago, children would learn more, period.

In the fourth grade classroom mentioned earlier, I put the students in tables so that they could work in groups. In Japan students often work in groups or pairs using the discovery method to gain information. Each person in the group can share in the responsibility and can have input into the work. However, in this particular classroom several parents complained because they didn't want their son or daughter in the same group as someone else's son or daughter. Part of learning is being able to work with others, but apparently someone forgot to teach that to these parents.

One other area of interest is the method we use for teaching. So many parents, teachers and administrators see learning as filling out as many workbook pages and dittos as possible. I don't deny that dittos or workbook pages can be useful, but perhaps it would be more sensible to use them as a tool for follow-up instead of an instrument of teaching.

In Japan, teachers use many hands on activities that allow students to discover, learn and manipulate concrete objects. While many people in the U.S. will agree they are visual people and like drawings or concrete objects to help them figure out a problem, no one wants to allow students who are younger and have less experience the same privilege. This seems contradictory for a society so bent on visual aides to sell products, put together unassembled objects and to tell a story (TV).

Another method we use in teaching is review. Teachers spend the first half of the school year re-teaching what students should have been taught the year before. Reviewing is important, but what I am suggesting is that in Japan teachers assume the prior teacher taught the students a concept (not a formula), and the students retained it. Since they deal in helping students to make sense of material, instead of memorizing formulas, the students can retain more information, and ultimately learn more because, instead of spending half a year reviewing, they only need two weeks and then they are on to new concepts.

The most important aspect of teaching is the student. Students are all individuals with individual learning styles (just the same as adults). We as teachers need to recognize this. Students are different today than they were 10 years ago. They have so much more input from TV, video, music, advertisements, real life experiences, etc., that we cannot stay in the stone age forever.

I don't think Japan has all the answers. The suicide rate among elementary students is enough to make me skeptical. The fact that most inventions come from the creative people in the U.S. who manage to be that way in spite of the system, and that Japan can copy and produce U.S. inventions at a lower cost but can't come up with their own ideas makes me even more skeptical of Japan's system. But there must be a happy median between the 2 systems.

I do know that there has been a major breakdown in the U.S. system of education. Somewhere between the intended curriculum, that is, the curriculum that parents and administrators decide on, the taught curriculum, and what the students actually learn, something has gone wrong.

Instead of sitting around and pointing fingers, as the politicians do, we need to work together, parents, teachers and administrators, to start repairing our breakdown. Let the politicians play their games, but let's not let their war's battlefield become our children's education. The only victims then would be our children. It's time to make a defensive maneuver while we are still alive and kicking!

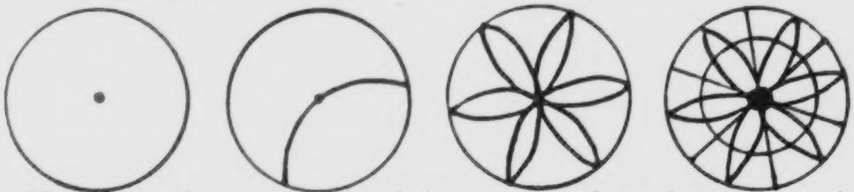
DESIGN IN A CIRCULAR FORMAT

Karyl Short

When Junior High students "discover" using mechanical drawing tools (e.g. compass, protractor), they often become very excited about the skillful, polished look they are able to achieve. When overused, drawing tools can become a crutch, inhibiting the expressiveness of artwork. But within limits, tools can offer new opportunities for creative expression, more design possibilities and a boost to the student's self-confidence in their developing craftsmanship.

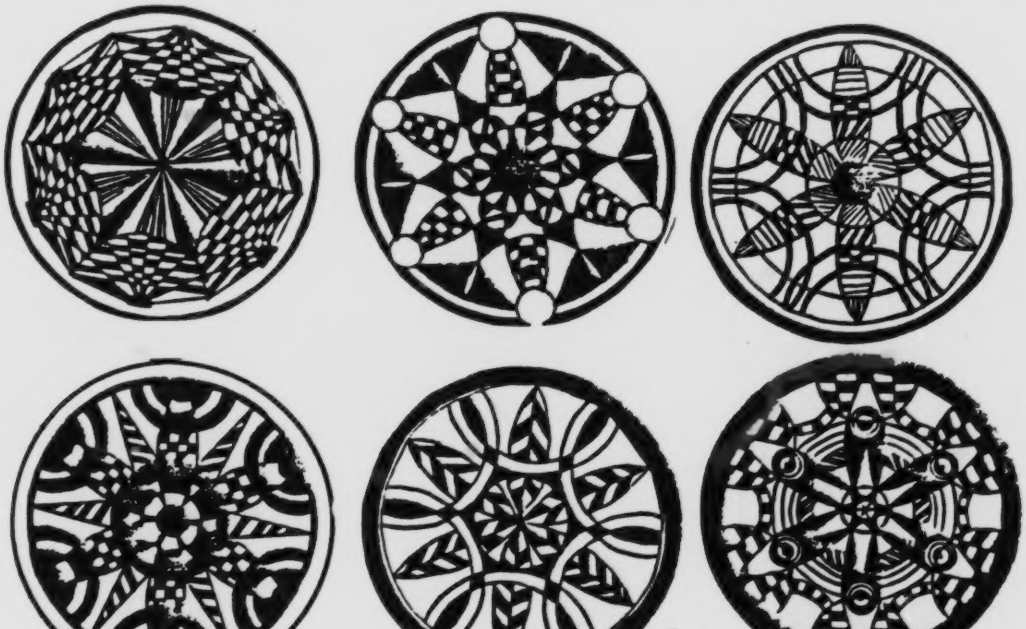
Materials needed for this project are:
--paper (enough for students to experiment with the tools)
--compass, ruler and felt-tip markers. The students should follow the basic directions and do a practice "flower-petal" design first.

Set the compass on 3" or 4" for the initial circle. Without changing the setting, divide the circle into six equal divisions.



Now the students can devise their own way of creating a geometric design by following a few guidelines:

1. Use the center point to make various sizes of concentric circles.
2. Divide into equal angles with a ruler.
3. Be sure all circles and arcs are at intersection points so that each line on the design is repeated six times at equal intervals.
4. Add repeated patterns (stripes, lines, checkerboard, etc.) to some of the areas.
5. Color with markers so that there is a balance of white, black and patterned areas.



STANDARDIZED TEST SCORES AND THINKING SKILLS: ARE THEY RELATED?

Sister Barbara Hudock

Standardized test scores are used in our schools to determine a student's growth in knowledge. I decided to see if there was a relationship between these test scores and children's thinking about the reality around them.

The child watching activity I used was a bottle of water, not quite full, with a lid on it. The bottle was turned at nine different angles. The students were given a paper with the bottles already drawn, shown the bottle of water at each angle and asked to draw the water line for each angle.

The results I expected to find were that students who did well on their test scores would also perform well on this activity.

The results I found were as follows:

Students' Age	Standardized Test Score Correct	# of Water Lines
7	.9	3
7	1.0	1
7	1.2	4
7	1.3	2
7	1.4	2
7	2.8	3
7	2.7	6
7	2.7	6

A student considered to be working on level would test 2.2 on the standardized test scores.

The last two students listed seemed to fit the results I expected: students with higher test scores would perceive more bottles correctly. However, the first six students listed did not fit that rule. By the end of my experimenting and comparing students' performances with test scores, I had the feeling that the students who did well on the standardized tests were able to give back or repeat the skills they had been taught but were not necessarily good at thinking skills.

TIC-TAC-TOE, A SIMPLE GAME

Catherine Fickert

I played tic-tac-toe with five children. I found that I am a consistent center square mover and I have a real compulsion for putting my "X" or "O" in the center if it is open. The 13-year-old played first by putting his X in the center but, when neither of us won, he started at the corner and won. He kept up the three corner, 2-way win strategy until I caught on and he started putting his first move in the center again, but we came to a no-win situation and quit.

The 10-year-old was fascinating. He said, "the advantage was at the center" and he started each game at first at the center, but when he had two X's side by side and I didn't block him, he didn't put in the third X to win; he put his X in a corner to make a 2-way win for himself. At first I thought he just didn't see his early win, but he continued this same strategy. When I asked why he did this, he said his way gave him more ways to win. This was interesting, he avoided an early win so he could have a sure win 2 ways.

The 8-year-old liked to start in the center, too, and said he had "any dimension" doing this and later said the corners were like "adding on" and "on the sides you have lots of dimension, too". He worried about his winning at first and said "you better stop me". When I caught on to his strategies, he would say "I better try something different." We reached a no-win point.

The 7-year-old and the 5-year-old were fun. The 7-year-old also started at center square and simply concentrated on getting her 3 symbols in a row. When she began to lose she wanted to trade symbols so she could win. After she began all the games and began losing, she wanted me to start the first move so she could win. She didn't use the 3-corner strategy but she felt if she switched symbols or had me go first instead of her, this would help her win. Her strategies were simpler than the older children. The 5-year-old knew about getting the 3 X's in a row on one side, vertically and when she had 2 in a line she would put her hand over the third square so I couldn't block and she could win. After I let her win a few times she said, "all you gotta do is block me." Then she said, "maybe I'll let you win." I think she was aware that I was letting her win and after we played about 12 games she began blocking me too! At the beginning she was only concentrating on her moves but towards the end she delighted in blocking me.

This was a great experiment. When we win with one strategy we continue to use it, but when the other person catches on, we look for another strategy to win. We are ready to quit when we reach a no-win situation. The older children could concentrate on their strategies and future moves as well as learn my strategy. The 7-year-old was concentrating more on changing the symbols and who goes first to help her win, whereas the 5-year-old thought it really neat to learn how to block me. The two younger children didn't use 3-corner strategy. They just concentrated on winning and getting three symbols in a row.

A MATTER OF COOPERATIVE COMPETITION

Barbara Garner

Early in my first year of teaching, I became distressed with the number of students who accepted failure and did not bother to try. I remembered a college course I had taken, in which we were grouped in study teams, and decided to further develop this idea.

I divided my class into study teams of preferably 4 students per team. I assigned students to each team so that all teams had approximately the same grade point average. At first I only used these groups on the day before a test so they could help each other review. The team with the highest average on the test received an extra 10 points. Most of the students, who previously could have cared less, gradually developed a certain team pride. The other students also improved because, as most teachers realize, learning really takes place when trying to "teach" someone else.

Now I let the study teams work together on the more difficult homework assignments and especially discussion questions. They have debates on current issues, first within each group and then among the teams. On these days students who do not agree with their group may physically move to join one with which they do agree. At the end, it is interesting to see by number of students which group has been the most persuasive.

The study teams also make up review games. Each team is required to write down a certain number of questions. They cut these apart and place them in a container which bears their team name. One by one, each team's members draw a question from another team's container. If the individual team member answers the question correctly, their team gets 2 points. If the answer is incorrect, they take it back to their team for a group answer and 1 point. If the answer is still incorrect, the next team has a chance for 1 group point and so on. The team submitting the question must judge if the answer is correct. Sometimes this involves a class discussion, but rarely do I have to step in and make the final judgement. At the end of the game, we tally up the points and each team receives that number of points on their grade.

Every now and then, I redivide the class into new teams. This usually happens when one team begins to win consistently. The other teams get discouraged and we arrive back at the same problem that started the whole idea.

DID YOU KNOW FUN IS A FOUR LETTER WORD?

Kathleen Ann Horn

How many times have you heard an educator tell students they are not here to have fun (God forbid), **THEY ARE HERE TO LEARN!!!!!!** You would swear that if you were to look up "that word" in *THEIR* dictionary it would be considered foul language. To have fun in a classroom was strictly taboo -- only to be done outside the classroom.

Many educators honestly believe that kids should come to school to learn, not to have fun, as if they are mutually exclusive. Those people need to come back from the dark ages. They have lost touch with reality. Haven't they heard that school is supposed to be a **FUN PLACE!!!!!** Thank God for those people who have heard the good news.

When a child has fun doing something he is going to learn more and retain it longer. He will be having fun and learning at the same time. It is sad to see a child be turned off to school when it should be one of the most meaningful, exciting and enjoyable times in their life.

That should be our goals as teachers, to make school a fun place to learn.

VALUES: HEROES AND VILLAINS

Fred M. Hechinger

Reprinted from THE **NEW YORK TIMES**:
April 28, 1987.

At the end of the day, the director of the nursery school in the outskirts of Moscow said, "You people," meaning Americans, "don't understand how to teach children values."

You have to focus on a historic hero who becomes the children's model, she explained. Having heard the 3- and 4-year-olds sing songs about Lenin's childhood that morning, I knew what she meant. I replied diplomatically that their revolution was only 50 years old, while ours was two centuries old.

"We've chalked up more heroes," I said, and I listed Washington, Jefferson, Franklin, Lincoln, and the two Roosevelts among others. She stuck to the one-hero concept; I preferred the American way of having many heroes.

That was in 1967. Twenty years later, the need to teach values is high on the agenda of American educators and politicians. Could it be that a major cause of this widely perceived crisis in values is the neglect of heroes as a result of historical ignorance: Too many young Americans (and many no longer young) are left with no heroes against whom to measure their own values. And a growing number of Americans, in ignorance of any historic heroes or, for that matter, villains, are vulnerable to ideologues who persuade them to put a single hero (or villain) on their pedestal of values. In a less sinister way, young Americans may simply make do with short-term pop heroes and their often questionable values.

The concern over teaching of values remains at a stalemate because there is little agreement about the kind of values to be taught. Recent conflicts over the content of textbooks centered as much on what has been left out (for instance, religion's role in history) as on what has been put in (for example, the theory of evolution). Because textbook publishers are afraid of losing sales, they tend to stay away from controversial issues that often involve conflicting values, such as discrimination against blacks, Jews, Roman Catholics, women or Orientals.

By simplifying, romanticizing or purifying the American past, schools often made history dull and drained it of values. One consequence of removing the warts from American history is that young people become cynical when they must later face some unsavory American actions.

For example, it is difficult for Americans to make rational value judgments about present-day relations with Latin American countries without the background of historic realities, including repeated North American interference in South American affairs.

Effective teaching of values also requires recognition of evil, at home and abroad. A full exploration of the evil of slavery and subsequent discrimination can be a powerful tool in teaching values. The brutality of child labor and its hypocritical defense by prominent Americans are rarely given much attention, despite their relevance to values placed on the rights of children.

These are mere random examples to show that values are hard to teach without a knowledge of history. Indoctrination is easy; teaching values through history is difficult because history honestly taught tends to be controversial.

Values are taught through models, and history is full of models - heroes and villains, and even complex mixtures of heroism and serious flaws in one and the same person such as Lindbergh, the hero of flight who became an apologist for Hitler.

Teachers in Sunday schools know the crucial value-teaching role of heroes and villains. Their advantage is that they deal with a population that agrees on specific values.

This holds a message for the schools - not to teach religion but to seek agreement about aspects of American history, ratified however informally, that exemplify values that hold the nation together and uphold the ideal of a free and just society.

Learning values requires facts. A recent segment of the television program "60 Minutes" showed a professor at a junior college in Olympia, Wash., testing his predominantly middle-class students on their knowledge of even recent historical facts.

Few of the students, who ranged from college age to middle age, could identify Albert Schweitzer; several thought he was a war criminal. J. Edgar Hoover was unknown to many and was recalled by one as a former President. Few knew of Karl Marx and at least one response identified him as one of the Marx brothers. More than half could not identify Kurt Waldheim. Even in the aftermath of the killing of more than 200 marines, 40 percent could not tell where Beirut is. One young woman said she had often heard mention of Winston Churchill but did not know what he did or when he lived.

This raises questions whether values can be taught without some basic knowledge about past and present events: the American debt to Churchill and to the Royal Air Force pilots in the Battle of Britain, the lasting meaning of the Gettysburg address, the Warren Court's impact on social justice, the political genius of the authors of the Constitution, or of the Land Grant College Act of 1863, which made it possible for many of these history-blind Americans to attend college.

Bill Honig, California's Superintendent of Public Instruction, has linked deficient values to a deficient knowledge of history and national traditions. He warned that it was "cultural suicide" not to transmit the values based on those traditions to each new generation of Americans and newcomers.

The answer is not the Moscow nursery school teacher's prescription of concentrating on one hero's values. The values that keep a democracy alive must be gleaned from a great variety of traditions and models. They cannot be taught through courses grafted on the curriculum and divorced from a deeper knowledge. Such knowledge eludes young people who neither read history nor the daily newspaper.

BEADSTRINGS
Judith Trelow

Child watching is an excellent way to learn how a child thinks and uses his knowledge, but should we only watch children? Adults (teachers) should be watched to find out how they think and use their knowledge too. Since learning is a continuous process teachers can be taught also.

Beadstring: S.P., a first grade teacher, was asked to find some numbers on the beadstring. Here is what happened.

I started out by asking her to find 5 beads. She cut the set of blue beads in half to equal 5. I then had her find 16 beads and she found it by grouping the beads by three's and adding one. The next number was 42. She started with the previous 16 and counted by one's to make 42. Next, I wanted her to add 7 and 4. She counted out 7 and slid 4 more over. Then she added 8 and 4. She counted by four's until she had 12 beads. We did several more adding problems and she would start the problems in the middle of the string or at either end. She told me that that was the key to this activity--being able to start at any place on the string. It wasn't until the last problem we did that she exclaimed, "Oh, these colors are marked off by ten's!"

We are always berating our children for not getting concepts when we teach them. We don't consider that it takes adults a while to catch on to concepts and we're supposed to have a higher order of thinking.

Be patient with children and give them plenty of hands on experiences without adults butting in and giving their answers.

CONFESSIONS OF A CHILDWATCHER

Barb Brackman

Childwatching, what a great idea. Things we take for granted suddenly take on new meaning. When I was given the assignment of the "Hidden Chip"* task I thought "big deal". Admittedly, the first time I did this task with my four year old, Abby, I didn't expect much. That should have been my first observation, my own attitude was picked up by her and I got what I expected - not much. Ten weeks later (and hopefully wiser) I repeated the task, this time with a positive attitude and maybe a better "childwatching eye". This time the hidden chip task turned into a shapetelling task as well. We started with two chips side by side. According to her, we not only had two chips, but they made a line. Three chips were a triangle and four, a square. The point I'm trying to make is, as educators, we need to be careful not to get so involved with the "right answer" syndrome we lose out on a more valuable lesson - the one from which the child will benefit the most. Yes, even though we have hours and hours of education and life behind us, we can learn from the ones we are trying to teach.

*(*The Hidden Chip task involves counting out a specific number of chips with the child, then hiding some and asking the child to tell you how many are hidden. -- editor)*

EDUCATORS - PARENTS
THE SAME GOAL . . .
Michael G. Garland

As educators, we strive to the best of our ability to equip our students with the information required to function in the outside world as an employable citizen. As parents, we strive to the best of our ability to prepare kids to function in a demanding world without our seeing to their every need. Both educators and parents are working toward the same goal. Why then do we have so many conflicts?

More often than not teachers are accustomed to talking to parents when their children are not performing well academically. This is a poor policy because the child is leary when teachers speak to parents and parents are on the defensive when they feel they are being contacted for a "problem". Progress reports seem to denote the same type of information. The student needs improvement....., is not performing well in....., must improve......

Perhaps a better policy for teachers and parents would be to keep the lines of communication open ***at all times***. This means that a teacher might call parents to let them know of a substantial improvement in something or a general compliment about some type of school work. Parents might check with the teacher from time to time to let both the teacher and their child know of their interest. In reference to progress reports, should such information being sent home from school represent devestation or can it be a positive note as well? Hopefully, educators will relay positive information in such reports so that school as a whole will be viewed more positively.

Educators and parents have the same goal in mind and we should work together to acheive such a task. Educators must let parents know they are interested in their students and parents must show an active interest in their child's school work. At the same time, both educators and parents need to maintain a positive attitude which will open the door to communication. If educators and parents work together as a team, we can insure a brighter future for "our children".

POSITIVE AND NEGATIVE IMAGES: SEEING SOMETHING BY LOOKING AT NOTHING

Karyl Short

In composition, the objects and the spaces fit together like pieces of a jigsaw puzzle. Together they fill up all of the area on the page format, so every piece (positive & negative) is important.

Imagine a person standing in front of the projection lamp of an overhead projector, so that their silhouette is on the wall. If you trace the inner edges of the negative space, you are also tracing the outer edge of the positive space. In other words, the positive and negative areas share edges; if you draw one you draw the other.

Drawing by observing negative space offers a new solution to a problem, a new way of seeing shape and a different perception of the object. To observe the negative space is to see the relationship of shapes without the tendency to perceive objects as they've been learned, rather than as they actually are. This can be a valuable tool to help children break away from stereotypical drawing and to teach observation skills.

Activities:

1. Materials 12" X 18" paper, 9" X 12" paper (contrasting color), scissors, glue. Divide the smaller paper into 3 or 4 strips. Cut or tear shapes or designs from the sides of the strips. Arrange positive shapes against the negative space of the background paper - back-to-back - to show mirror image. Finalize the arrangement and glue down.

2. Draw some large forms on a sheet of paper (examples: flowers, bottles, abstract shapes, etc.) The forms (positive areas) must touch the edge of the paper in at least 3 places. Darkly outline the edge of the negative space including the edge of the paper. Shade in the negative space.

3. Choose a magazine photograph of a human figure in action (dancing, playing football, etc.) Turn the photo upside down to prevent the positive areas from "taking over" and draw the negative space.

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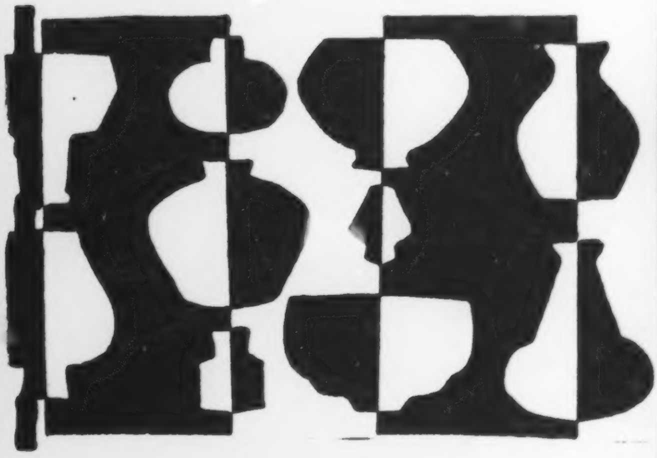
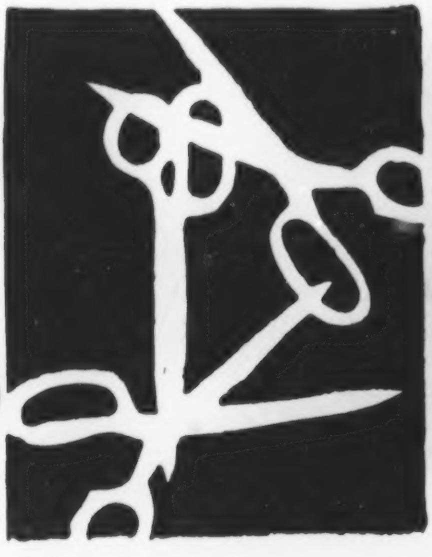
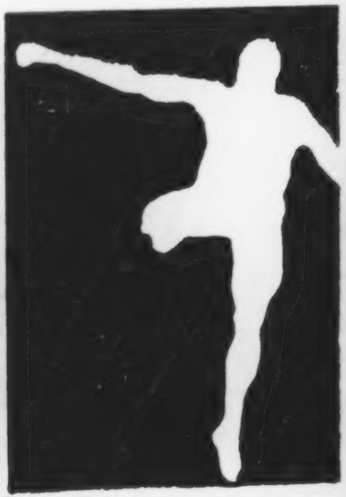






WORDS OF WISDOM FROM THE PAST
Howard Elmy

Winston Churchill, a great British statesman, made a remark that has impacted the educational system of his country. He said, "Personally I am always ready to learn, although I do not always like being taught." Does the individual like to learn? Do we always like to be taught and is it good for us?

Working on an experiment for my math class, I had an encounter that really brought meaning to what Churchill had said many years before. Using two 12-year-old children with similar abilities, I proposed a problem of determining the number of combinations in an ice cream cone. The items to be combined were: two ice cream flavors, two types of cones and three toppings.

One young lad performed the problem concretely, until he arrived at the correct answer, 12. I decided to deny his work and say he was wrong. He remarked confidently, "It doesn't matter, I know its right." Wow, what confidence! It really stuck with me.

Later that day, I was working with a young girl who also came up with 12. After concretely finishing the task, she asked if her work was correct. I refused to answer in a manner of confirmation and she was hesitant and unsure of her work. There lay the answer before her, but she could not trust what she had done. That also stuck with me.

Is it our educational system that takes away confidence in some children? The young girl lacked confidence in her own concrete operations. So many children today "know about" math, but do they "know" math? Have children learned by rote memorization; therefore not having the ability to apply what they have learned? Let's take a look at ourselves in the light of Churchill's remark. Do you enjoy learning; how about being taught? Then remember your children and how they learn.

COMPETITION

Jackie Carder

Competition? Well, its as American as apple pie some might say. It is true to some extent that Americans enjoy competition. We love the Olympics because it gives us a chance to beat the Russians, and everyone loves the World Series - I've even seen people shed tears after a loss. We compete daily whether it be for a job or a parking space - it's everywhere. Yes, everywhere - even in our schools.

I want to relate to you a heartbreaking story about competition among our young. I'm sorry to say that this story is true.

My cousin, a third grader, was his class spelling bee champion. This entitled him to compete in the school competition, which he had won last year and for which he was named "the Second Grade Champion." The school spelling bee is held in the gym with all of the students and teachers present, and of course parents. The contestants are seated on the the stage. The third grade competition began and T.R. was given the first word. The word was "catch". The problem was that the announcer let her southern dialect interfere and the word became "cetch". Like a good phonetic speller T.R. spelled it "cetch". The announcer flatly said "no." The look on that little boys face was enough to break any heart. He went back to his seat on the stage where he sat feeling ashamed. That child was so upset that he bit his knuckles to keep from crying. He bit them so hard they bled. He later told us he was so embarrassed he would never compete in a spelling bee again. He said he spelled the word she pronounced and after we pronounced the word the right way and asked him to spell it for us he did so correctly. He feels like he was a failure in front of the whole school. He is hurt and embarrassed.

Was this competition really worth the pain it has caused this boy? It really isn't a competition, it would be better labeled a performance. We want to see who can put on the best show. The question is, should our children be in school to learn how to be competitors (or actors if you will) or should they be there to learn? I believe the answer is obvious.

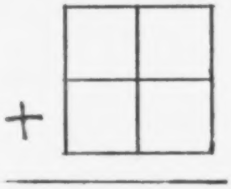
BUILDING A NUMBER

Linda Dabbs

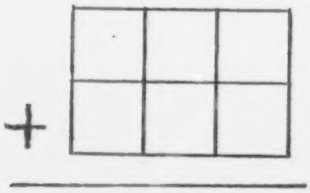
Students enjoy activities that involve reasoning along with a little luck. This activity can be used for a few minutes or as long as an entire class period.

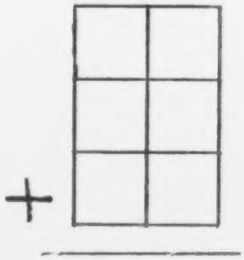
The digits 0 to 9 are placed into a container and drawn randomly. Once the number has been used, it is discarded until the next activity starts.

The easiest level is to build the greatest sum using four digits.

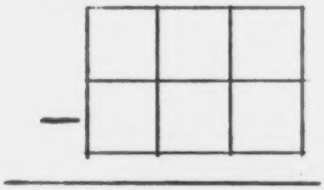


The caller selects one digit, then the students place that digit into one of the squares. Then three more digits are called and placed one at a time. The student with the highest sum is the winner. The sum could be used with more digits and different positions.

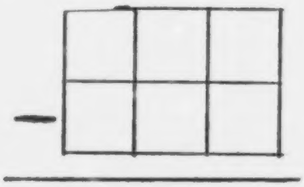




There can be many winners with addition once the idea is learned. This activity can also be used with subtraction or multiplication. Here the number of winners dwindle.

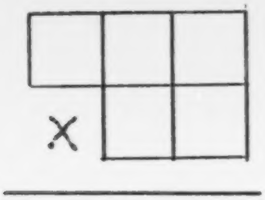


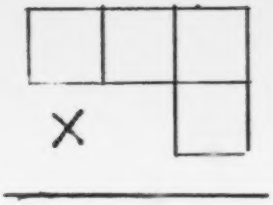
Build the smallest positive difference.



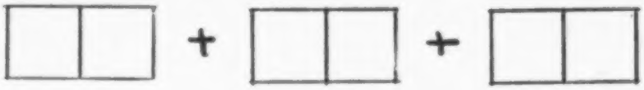
Build the greatest difference.

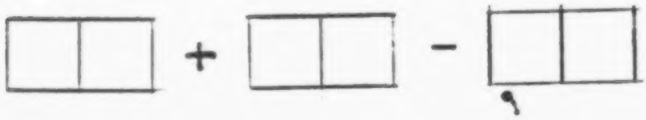
Multiplication

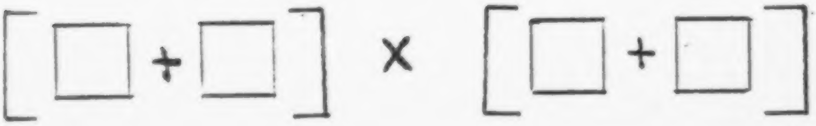


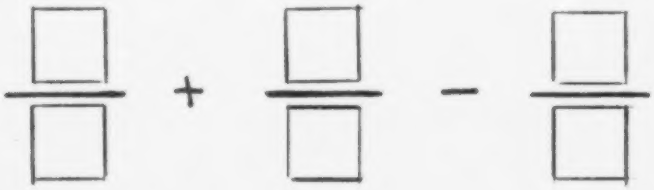


Build the greatest product.
Another variation is to try to get nearest to a target number.









There are many variations for this activity. The thrill of chance and logic give excitement to this activity.

AUTOMOBILE MATH
Julie Vollmer

Driving in the car on vacation was always rather boring for my brothers and sisters and me, so we decided to make up games using the license plates of cars. We would have never thought of it as math back then because the games were "fun" as compared to what we did in school.

We would each pick a car and add three digits on its plates, and the person who came up with the highest number was the winner. The first to win 10 rounds was the overall champion. We would each check to make sure the other person was adding correctly so that no one would just happen to make a mistake and win the round. As our game became more sophisticated, we would multiply the digits and then divide that number by the last digit on the plate.

I showed this game to my younger sister a few months ago and she too found it quite enjoyable. When I told her she was doing math she said, "This isn't the way we do it in school. This is a lot funner." Activities like this can not only eliminate boredom in the car, but also be a fun, learning experience.

QUOTATIONS

Compiled by Joyce Bishop

THE ENQUIRING MIND: An Approach to Understanding Children's Learning by Stephen Rowland
The Falmer Press
London and New York
Taylor and Francis Inc.,
242 Cherry Street
Philadelphia, Pa. 19106-1906

p. 1
". . . at the heart of any good teaching and learning experience is a critical relationship, that is a relationship in which teachers and learners alike seek to question each other's ideas, to reinterpret them, to adapt them and even reject them, but not to discount them."

p. 18
"An essential feature of play-like activity, which is usually lacking in the "teacher-structured" approach, is the degree of control which the children are able to exert over their activity. By "control", I do not mean only autonomy in the choice of the activity but also in respect to interpretations made in its course, its further development and overall objectives. Time and again it became clear to us that when the children exercised control, their activities developed rationally in response to events as they arose, while they bore in mind certain overall objectives. In this way, the children's exercise of control involved a structuring to their activity."

p. 37
". . . there is a strong sense in which as soon as they begin to tackle real problems, problems as they have constructed or interpreted them, then learning takes places and the knowledge, is but a reconstruction of it."

p. 70
"When the children controlled their practical activities, the degree of their emotional commitment to their work, and of the work's significance, appeared to be greater than when they were circumscribed by the prescriptions of work cards, textbooks and so on. The relationship between significance or meaningfulness and control here is very close."

p. 116 ". . . through their writing the children would objectify their experience, this casting it in a form which enabled them to view it critically, to relate it to their more general experience of the world, to go beyond it or, in general to "operate upon" their experience.

". . . it appeared that the children's ability to "operate upon" their experience was the key to their abstract thinking. The process of abstracting itself required this. The argument . . . is, then, that writing must play a crucial role in the development of abstract thought."

p. 116

"Furthermore, through the narrative of their story writing, their thoughts were directed towards a continuous and critical appraisal, as the elements of fantasy and reality were related and the human issues which emerged were explored. It makes sense to view this kind of awareness on the part of child writers as enabling them to gain a degree of control over their imagination. And, if the imagination is the source of the intellect, they thereby gain intellectual self-control."

p. 148

"The idea of "conversation" is suggestive of the way we can encourage this natural tendency to learn without taking control away from the learner. By fostering a "conversational" relationship with children we can enable them to reflect upon their activity, by presenting them with new ideas, alternative perspectives on their work and by setting up a dialogue. But, as "conversation", such interaction recognizes that children will reinterpret our suggestions, intentions and ideas. This process of reinterpretation highlights the unpredictable nature of learning (and also of conversation), making it impossible for us to narrowly determine what learning will result from a sequence of interaction. However, its recognition is vital since it is by this means that children transform our ideas into a form which is appropriate to their experience, thereby enabling them to make sense of our ideas and use them in such a way as to confirm their control over their activity."

p. 151

"Outwardly, skill is seen as arising and being developed in response to the requirements of the activity and its goals. Rather than being an aspect of development which requires practice in isolation before it can be used towards creative ends, it in fact emerges in response to those ends. Its development takes place within a context which provides not only motivation for its practice, but one which enables the child to see its purpose and develop an awareness of it.

. . . . It appeared that this awareness grew as a result of their inventiveness. As the children invented ways of resolving their problems, so they became prepared -- or reached a "state of readiness" -- for new knowledge. Thus inventiveness and the mastery of conventions are not opposing aspects of learning, but on the contrary, the one paves the way for the other."

MATHEMATICS IN PRIMARY SCHOOLS
School Council Curriculum Bulletin No. 1
London

Her Majesty's Stationary Office
1972

p. 10

"Perhaps the classroom situation we want to create will be further clarified by a statement of our aims in the teaching of mathematics. We shall limit these to three. The first is to make children think for themselves. The second is to give children a knowledge and appreciation of mathematics as a creative subject; of its order and pattern (in number as well as in geometrical form); of its vital presence in everyday life and in the environment, not only in man-made things but in natural forms as well. Children who learn to appreciate mathematics in this way, as a subject in which they make their own exciting discoveries and which holds fun and fascination for them, have full confidence in their own abilities. The third aim is to give children a facility with number and quantity relationships or more briefly, to give them skill in computation."

Additional quote from **PIAGET'S THEORY OF INTELLECTUAL DEVELOPMENT**

p. 111

Children are unable "to deal with several aspects of a situation simultaneously. This is due to the egocentric nature of the child's thought or the incapacity to shift attention from one to another aspect of a situation. In the case of speech, the young child cannot consider both the other's point of view and his own at once, and therefore centers solely on his own point of view."

COUNTING & BEAD STRINGS

Martha Boston

I've done my Field II Experience this quarter in an L.D. Resource Room. I've spent much time working on an individual basis with the students.

Something interesting happened when I was working with a second grader who does poorly in math. He is very particular and tries very hard. We were counting on the bead string. I had him show me 8, then add 4, then subtract 3, then add 12, then add 20. He meticulously counted each bead individually and came up with the right answer each time. Throughout the exercise (I worked with him for a long time) he never realized that the beads were in groups of ten by color. When we finished counting, I asked him how many beads were on the whole string and immediately he said 100. I asked how he knew and he said, "That's how many it looks like." We then counted 50 beads and folded the string in half. He could see that there were the same number on each side. H added 50 + 50 and got 100 --- proof that there were 100 beads on the string.

When we finished, he was told by the teacher to write numbers from 1 to 100. She gave him a sheet of large squared graph paper. He started writing until he got to 49. He couldn't go beyond 49. He did not know what came next and was beginning to get frustrated. He came up with all sorts of answers except 50. I got another piece of graph paper and put bold orange lines down each side so there were 10 squares between my lines. He started writing again. This time he had no problem reaching 100. Since he was writing in blocks of ten, he would look up and see that the previous row ended with 40 and knew immediately the next had to end with 50.

TO TELL THE TRUTH

Barbara Garner

This activity is designed primarily for the upper elementary and secondary grades and is based on the old television game show. It could be geared to almost any subject such as literature, science, history, or math.

Pick 3 students to be the contestants. Other class members can make up the panel that will ask the questions. Time should be given for the 3 contestants to decide who will be the "real" person and who will be the impersonators. The game can be limited to a time period so that each panelist has an opportunity to ask a predetermined number of questions. At the end, each panelist must vote for contestant #1, #2, or #3. Time might be given for each panelist to explain the reason for their choice. After all ballots are cast, ask for the real person to stand up.

WHO'S GOT THE PASSWORD?

Barbara Garner

Write a question on the door or other designated place in the classroom each day. The question could vary from a spelling word to a math problem or virtually any other subject. The students can use any resources available to find the answer sometime during the school day. As they leave the classroom, each student will whisper the Password to the teacher. This could be a good motivational tool for the elementary grades and would help students begin to learn how to do research and what sources to use.

METHODS - METHODS - METHODS

Tracey Rubemeyer

By now most of us have learned many and various types of teaching methods. We have a method for nearly everything. There are also many different resources for us to use to discover new methods - **SEEDBED**, to name one. Yet, with all our learning and all the resources available to us, we often get caught in the rut of teaching certain concepts with only one method.

The reason there are so many methods is there are many different students with many different learning styles. We have yet to find a single method that can be used internationally with every student. So why do many teachers insist that addition be taught using this method and subtraction that method? Many teachers often grasp onto the single method that works fairly successful for them one time and follow it religiously throughout their careers. Yet, this can be very detrimental to some students. What about those who don't understand? We must compensate for them, too, by allowing ourselves an open mind. If a child doesn't understand a method, don't give up. Try a new method, and if that doesn't work, try another. With so many methods made available to us it would be a shame to get caught in a rut at the expense of the students.

TWO KINDS OF MATH

Anonymous

In a first grade classroom, I witnessed a terrible situation for Math. The children were working in their workbooks. There was a number line from 1 to 20 at the very top. The next section had pictures of 2 sets of bundles or dots or pencils, etc. One picture had 2 bundles and 9 sticks with the number 29 written under it; the other had 3 bundles and a blank. Directions were: Write the correct number of sticks in the blank and circle the answer which is more. There was no reference to that number line, to counting or to real objects. As I walked among the desks and saw the confused faces I asked if they knew how many were in each full bundle. Sometimes that was all that was needed. The child could count the sticks in the bundles and find 10 and figure the answer from there.

In the next section, the child was simply to "write the number which is 1 more than the number given." (35, ____). I sometimes changed the language to "When you count, what comes after 35?" or "What number do you say after 35 when you count?" The teacher did nothing to help their understanding of the task except to work the first problem with them and then "grade" it at completion. In between she literally screamed at children for being lost or slow or not finding a pencil or other such travesty.

I can't wait to get back to Kindergarten's Math Their Way! In that curriculum the kids have the opportunity to manipulate objects, to sort and classify "junk", to count and to learn to predict. One of the favorite activities of this curriculum is for the kids to guess what is in a paper bag. Students are permitted to ask questions that can be answered yes or no. I found it interesting that early in the quarter the kids asked specific questions such as, "Is it an apple?" but later asked descriptive types of questions such as, "Can you eat it?" or "Can you play with it?" and then worked from the accumulated clues to try to reach a solution. Although their questions still did not provide sufficient data to reach a correct answer, they were able to use the clues and piece together a plausible guess. It was exciting to see how sophisticated their thinking had become in such a short time.

The sad part is that next year many of those enthusiastic, thinking little creatures will be stifled in the first grade classroom described above. My heart breaks at the thought.

MENTAL MANIPULATIVE MATH OUR WAY

Averyl D. Mueller

In **YOUNG CHILDREN REINVENT ARITHMETIC** by Constance Kamii with Georgia DeClark they suggest primary students engage in mental math. Children need to construct their own mental structure using their ability to think, resulting in knowledge building. They simply need to be able to do it "their own way" and start their building process. Is there a right way or a wrong way? Think about it! Doesn't everyone, no matter what the age, use what's best for them.

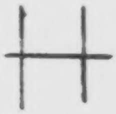
Mental Manipulative Math Our Way is based on touch (manipulate) see and talk about it--work with the task--develop the task--understand the task. Activities, such as those below, are only one interpretation of Mental Manipulative Math.

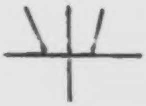
ACTIVITIES

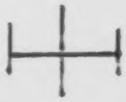
Number

Counting Sticks and Numbers

Have students use counting sticks, if you are working on the number 5 have them find 5 counting sticks or find 4 and one more counting stick. Then arrange them with every stick touching at least one other stick. Watch for the wonderful designs.





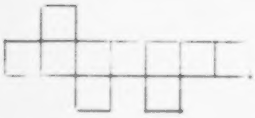


Number of the Day Out

Have the students form a circle. Pick a number for the day; start counting one--two--three (number for the day) and that student is out. Start over with one--two--three (out). Keep going. Before you begin, ask, will everyone be out? Can everyone get out doing this activity? Why or why not?

Cube Designs

With larger numbers, use interlocking cubes for the number they may be working with. With that number let them develop designs.



10 cubes

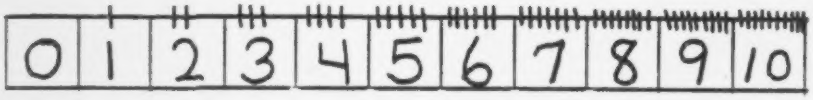
Dog

Addition

Clip Addition

2 Players

Label two wooden cubes 0 to 5. Roll the two cubes and remove plastic clips from tagboard totaling the amount on the two cubes. If cubes say 5 and 2 the player may remove clips above 1 and 6, 3 and 4, 2 and 5 or 7. A player may roll again and play until there are no clips that sum the amount on the cube. After each turn, new clips must be replaced on the tagboard. When players are finished -- Who has the most paper clips?



Story Problems

Continually use oral story problems. Students have counters on their desks (cubes, blocks, crayons etc.). Tell a story problem.

Jim has 5 dogs.
Ginnie has 3 dogs.
How many dogs are there in all?

Students use counters to decide how many dogs. Then let students tell story problems to each other. Finally, make it all oral and mental; let them tell story problems to each other using no counters.

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OBSERVATION ACTIVITIES

Mary Johnston

The following are observation activities my sixth graders enjoy:

1. The children close their eyes sometime during the day and see if they can tell me what I am wearing. (clothes, describe my hair, jewelry, shoes, etc.)

2. The children take off their shoes and line them up in random order along the wall. They take turns trying to match the shoes to their owners.

3. Have the children sit with their eyes closed for about three minutes and then write down everything they heard felt, etc. They also write how they felt (scared, relaxed, etc.)

The children will hopefully learn that seeing with their eyes is not the only way of observing.

DR. O'BRIEN
Cathy Fickert

You have awakened in me the awareness of how a child learns.

You have given tasks that surprised me, made me stop, look, listen, observe.

It is exciting to be aware, but I also want to grow and find ways to help children learn, grow, and be all that they can be, supporting.

I have new insight, new goals as a person, and parent, and teacher.

Everything you have shared with us has led me here, ***I am not the same.***

You have planted the seeds; now it is up to us to nourish them and water them, provide sunshine, warmth, so they can grow. ***It is up to us now.***

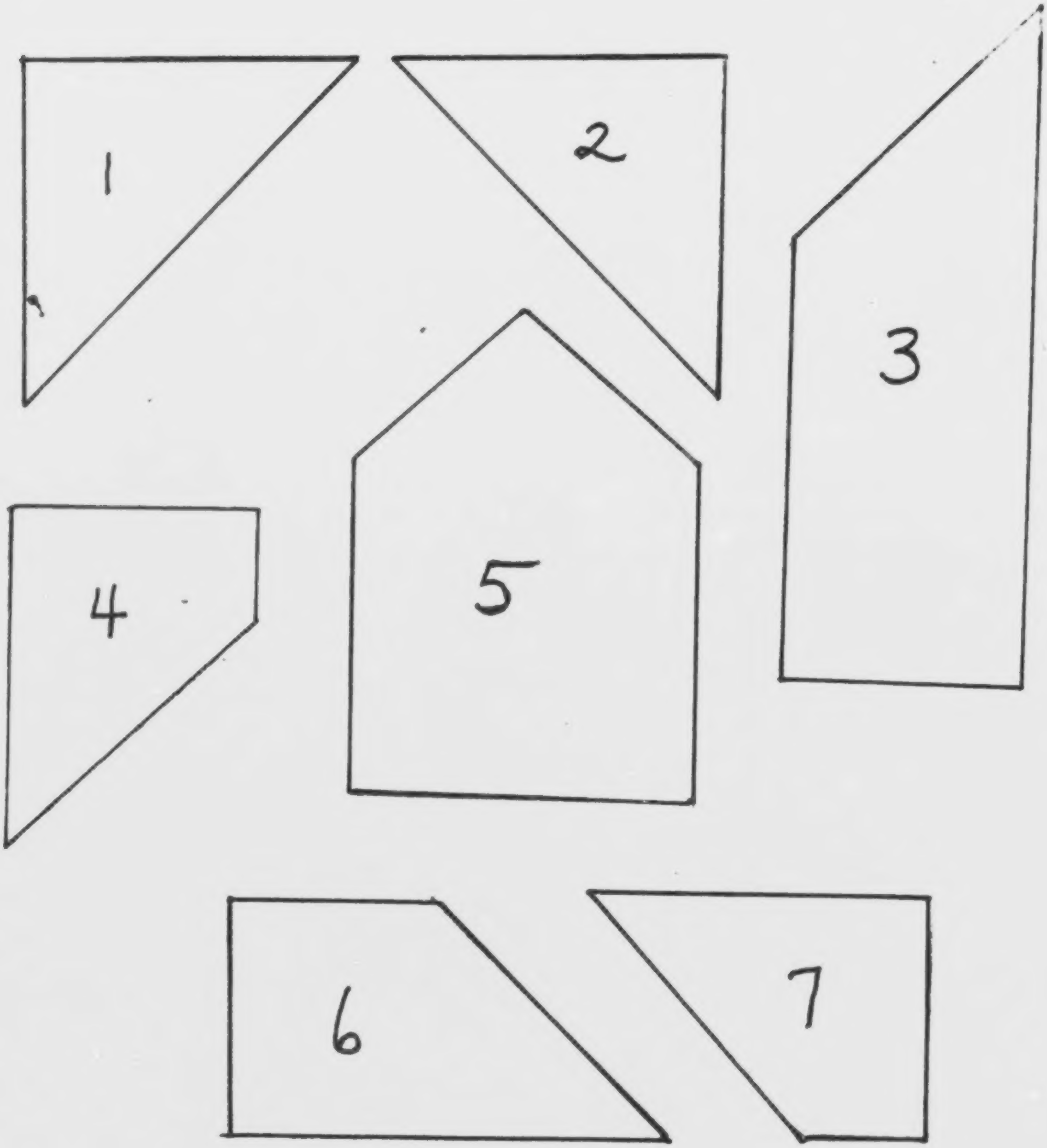
Concern for children - I believe it is your purpose.

THANK YOU

ZOOGRAMS

Martha Boston

The ancient Japanese invented this game and it is still played by Japanese children. Trace the shapes on a piece of cardboard then cut them out very carefully. With ink and crayon, color both sides of each piece a solid black. Now put the pieces on a table and see if you can put them together to make animal silhouettes. All seven pieces must be used to make each animal.



MEMORY? M-E-M-O-R-Y?

Unknown

It was brought to my attention this quarter that some children are simply not able to memorize. Spelling words, addition and subtraction facts, even telephone numbers and addresses are difficult for some to recall.

This isn't a new issue for me because I teach learning disabled students. The majority of my students are simply not able to memorize or their short term memory skills are weak. I fear there are many other students in regular classrooms whose memory skills are also weak.

Why then, are we still pushing more and more rote learning on children who are not succeeding in this learning style. It's a little like slapping the knuckles of a right-brained child who finds it more comfortable and efficient to use his left hand. We realized years ago that this was wrong - to make a left-hander into a right-hander. Now, we are coming to realize the negative effects of the rote teaching style on some children.

More emphasis should be placed on predicting, problem solving, and applying skills, rather than memorizing. Most children are capable of using thinking and processing skills when given the opportunity.

I tried the following with a group of fifth graders. As their social studies teacher, I gave examinations requiring short answers or "mini-essays." After five or six of these types of exams, I asked the students to write questions of their own. The students were also asked to supply an answer to the question they submitted. They weren't aware I would actually select a few to use as their examination.

This activity worked out better than I anticipated. The students learned more about the subject matter than they would have answering multiple-choice questions. And I learned a great deal about the thinking ability of my students.

MAKING MATH REAL
Beth Young

Many teachers administer interest inventories to their students to find out more about them such as their likes and dislikes, experiences, etc. How about turning the tables and having the class do interest inventories on the teachers and administrators? Divide the class into groups of about four students and have each group make up 20 questions, of their own choosing, which will provide them with pertinent information about their teachers. (The teacher should screen these, just in case.) Have them prepare the questionnaire and distribute it to the staff. When they have collected their information have them total up the answers and work out the percentages of answers for each question.

Have them make up bar graphs from their results. The groups should exchange graphs to compare their results and questions. Post all the graphs in the room. Then give a quiz based on these results, leaving the bar graphs up so the children can look at them and get the answers from these graphs. This should help in their ability to read graphs because the information is probably quite interesting to them. You could also have a class discussion of other possible questions that could have been used.

A NOVEL APPROACH

Kathy Kuensing

While working on a child watching task I became totally amazed at the responses of one second grade boy. The child watching task was the hidden chip task and the student's name was Graham.

Before I begin, I want to mention that there were 3 or 4 students in this class that impressed me from the very beginning as being very bright and Graham was not one of those students.

Starting with 12 paper clips, I asked Graham to count how many clips were there and he said 12. I then asked him to hide his eyes and I covered 4 clips. I asked him to look and tell me how many were hidden. He correctly reported 4. I asked Graham how he knew there were 4 hidden and he said "There are 8 left and 8 is 2 less than 10, 12 is 2 more than 10 so you add 2 to get 10 and 2 more to get 12. 2 + 2 is 4 so you hid 4. I couldn't believe it! I had to ask Graham to repeat what he said so I could write it down. I tried this task with the rest of the 24 students in the class and not one of them came to their conclusion as Graham did.

I was amazed that this 8 year old boy came up with the same answer as his peers by such a sophisticated means.

TEACHERS LEARNING

Karen Young

We as teachers (or future teachers) need to know why children behave and think the way they do. How can we ever hope to teach children if we do not have a good idea of how they learn?

We teach children to give the correct answers without bothering to find out how they perceive what they are doing. An example of just this is the response a 7 year-old gave to the question: Which one of the five is least like the other four?

1. bottle 2. cup 3. tub 4. funnel 5. bowl

He responded with the correct answer "funnel". But when he was asked, "Why did you pick funnel?" His answer was, "You can drink out of a cup and a bottle, take a bath in a tub and eat out of a bowl and I don't know what a funnel does." As you can see his thinking did not really help him to get the right answer. It was really more of a guess than any kind of reasoning.

Had this been a question on a test at school he would have gotten the answer marked correct. It would have been assumed by the teacher that he understood the relationship between the objects when in fact he did not.

As teachers we need to learn to look at the child's right answers and wrong answers and question "Why" to all responses.

We as teachers can help children to learn, but children can also teach us a lot about themselves and their thinking.

I will leave you with one last thought: Is it possible that most (if not all) behavior problems in schools are a direct result of the frustrations the child is enduring because he is not being understood by the adults who deal with him?

IT COUNTS TO COUNT

Theopal L. Morgan

Children enter school having accomplished a great deal of "self-teaching" for practical and intrinsic reasons. They develop confidence in the self-taught techniques that prove reliable. They often revert to the same, practical methods when challenged in the formal school setting.

One of the most important practical arithmetic techniques employed by the young child is counting. Since counting forms the core of children's practical arithmetic, children should be afforded as many counting experiences as possible. Counting experiences will help with bridging the gaps that exist between informal and formal arithmetic.

Based on the desire to provide a variety of counting experiences, a group of students were randomly selected and asked on this particular day, to merely count to 100. Those children selected were: Timothy, grade 1, age 7.0; Lamar, grade 1, age 6.1; Marlow, grade 2, age 8.3; Ernest, grade 2, age 7.11; and Bobby, grade 1, age 6.0. When asked, each child proudly counted with confidence to 100. It was interesting to observe the delight and pride with which the children responded to an activity that their teacher found a bit monotonous to listen to after hearing the first child recite. The children remained interested. As each performed the counting task, the other waited patiently for his turn.

The most interesting observations came about when the children were given paper and pencils and were asked to write their numbers. The following report is an account of each individual's responses.

Interview with Timothy

I: "Timothy, can you write to 100?"

T: "Yes."

I: "Would you write to 100 for me? You may write 1 to 100 or you may start with 50 and write to 100."

T: "I will start at 1."

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17
18 19 20 21 22 23 24 25 26
27 28 29 30 31 32 33 34 35 36
37 38 39 40 41 42 43 44 45 46
47 48 49 50 51 52 53 54 55
56 57 58 59 60 61 62 63 64 65
66 67 68 69 70 71 72 73 74 75
76 77 78 79 80 81 82 83 84 85 86
87 88 89 90 91 92 93 94 95
96 97 98 99 100

T: Stopping with 100, Timothy stated, "That's all I can do."

I: "Are you sure? You have done perfectly so far. I wouldn't be surprised if you could write to 120. Would you try just a little bit harder and write to 120 for me?"

T: Smiling, putting his pencil down, shaking his fingers out on the hand he used to write with and picking his pencil up again, Timothy resumed writing.

105106 101102
131 141151 107 103104
161 171 108110 [illegible]
181 191 120 111121

T: After writing 120, Timothy stopped and put his pencil down. Then he said, "That's all I can do. My hand is tired.?

I: "Alright, Timothy. You have done just fine. I'm curious to know if you can count from 120 to 150. Can you? (Without hesitating, Timothy counted from 120 to 150 and did not make a single mistake.)

I "Thank you, Timothy. You did a great job!"

T: "You're welcome, Mrs. Morgan."

Interview with Lamar

I: "Lamar, would you write your numbers to 100 for me?"

L: "Okay."

I: "Where do you want to start writing from, 1 or 50?"

L: "I guess I'll start with 1."

1 2 3

Experiencing a change in mind, Lamar said, "No, I thing I'll start with 50."

50 51 52 53 54 55 5 657
5859 60 61 62 63 6 46566
676869 70 71 72 73 74
75 76 77 7879 80 8182
8384 85 86878889
9091 92 93 94 95 96 97 98
99 100

(Stopping at 100, Lamar breathed a deep sigh of relief.)

I: "Excellent, Lamar. Can you count from 100 to 120?"

L: "Sure." (He counted with accuracy from 100 to 120.)

I: "That was so good, Lamar."

L: "I can write them too."

I: "Oh, you can? Why don't you?"

L: "Okay."

100 102 130 1'

Putting his pencil down abruptly, Lamar looked up and said, "M-m-m-m, maybe I better not."

I: "You did just find, Lamar. I'm going to share with your mother how well you did for me. Thank you.

L: "You're welcome."

Interview with Marlow

I: "Marlow, can you write your numbers past 100?"

M: Shaking his head up and down in an affirmative way, he began to write.

100 200 300 400 500

I: "That's interesting, Marlow. Start with 50 and write to 120."

M: "Alright."

50 51 52 53 54 55565
60 6.1 62 63 64 65 666
5859 68 9 70 7172 737475
76777874 808182 83848584
87 888990
91 92 93 94 959697 98
99 100 1001 1002 1003
1004 1005 1006 1007
60

I: Pointing to 1001, Marlow was asked to read the number.

M: "One hundred and one."

I: "Write one hundred and ninety-nine."

M: 10099

I: "What's next?"

M: "Two hundred."

I: "Write it."

M: 200

I: "Write two hundred and one."

M: 2001

I: "Write nine hundred and ninety-nine."

M: 90099

I: "That comes after nine hundred and ninety-nine."

M: "Ten hundred."

I: "Write it."

M: 1000

I: "Write ten hundred and ninety-nine."

M: 1000ad

I: "What comes after ten hundred and ninety-nine?"

M: "Eleven hundred."

I: "Write it."

M: 1100

I: "Marlow, you are just too much. This has been so much fun."

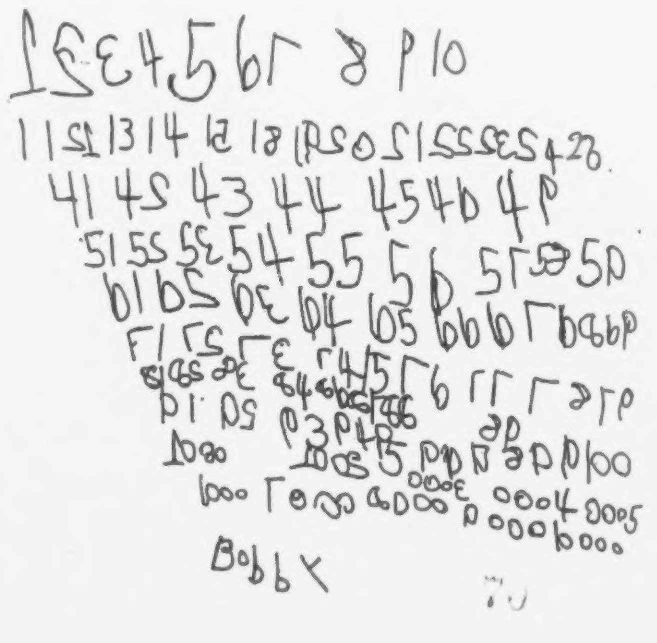
Observations with Ernest

(Earnest wanted to show that he could write past 100 to one million. He was asked to stop at ten hundred and five.)

100 102 103 104 105 106 107
108 189 200 201 202 203
204 205 206 207 208
209 300 301 302 303 304
305 306 307 308 309 400
401 402 403 404 405
406 407 408 409 501 502 503
504 505 506 507 508 509 600 601 602
603 604 605 606 607 608 609 70.
701 702 703 704 705 706 707 708
709 800 801 802 803 804 805
806 807 808 809 900 901 902 903
904 905 906 907 908 909
1000 10001 10002 10003
10004 10005 1

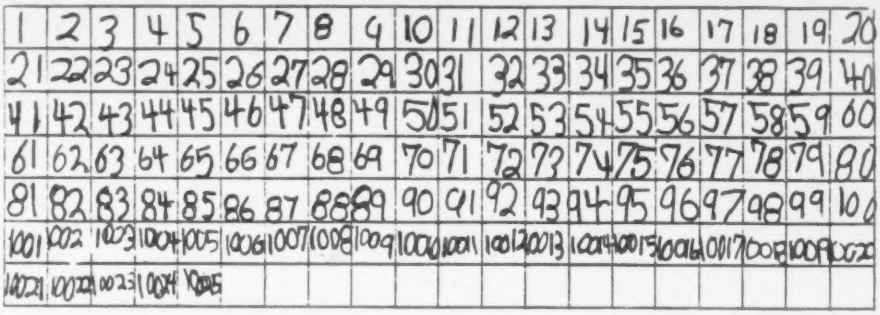
Observations with Bobby

(Bobby was asked to count to one hundred. He was able to do so with no difficulty. As a matter of fact, he counted to one hundred and nine before he started to have trouble.) This is how he wrote the same numbers:



Jennifer
(Grade K: Age 6.1)

The following paper was collected from Jennifer at the end of a free period. She had not been asked to write her numbers. She was given the graph paper with no instructions at all. Compare Jennifer's responses with Marlow's.



1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
1001	1002	1003	1004	1005	1006	1007	1008	1009	10010	10011	10012	10013	10014	10015	10016	10017	10018	10019	10020
10021	10022	10023	10024	10025															

The following summation can be applied to the child watching task of counting in which verbal skills and paper/pencil written skills were compared.

1. Young children enjoy the sheer act of counting for the sake of counting or for other intrinsic reasons.

2. Written math lags behind informal math.
   a. Writing is difficult.
      1) It is time consuming.
      2) It is physically straining.
      3) It requires the development of find motor skills and visual perception skills along with numeric knowledge.
   b. Writing tends to show less of a skill than a student actually knows.

3. Numbers after 100 become "ambiguous" for the age range observed, however, the children showed evidence of self-taught patterns that will serve as the beginning development of concrete operations.
   a. There was evidence that children were forming their own rules for writing numbers after 100.
   b. Formation of logical patterns based on concrete thinking was developing.
      1) It is very logical that a child would think of writing one hundred and fifteen as 10015. (This could also represent how literal children are at this age.)

4. The formal language of math will be confusing for the young child and should be kept as simple as possible. If one hundred and five is perceived as 1005, think how much more ambiguous the strange vocabulary of formal math will be.

5. Exposure to a vast number of counting techniques is important. Counting is concrete. Learning math moves from the concrete to the abstract. Provide children with as many concrete, tangible, audible, and visible materials as possible.

6. There is a need for children to feel that they are the ones in control. This was evidenced when the children adapted the situation so that they could respond correctly or could protect themselves from the exposure of revealing that they did not know.

IT'S A SNAP

Rod Jackson

Purpose:

This activity provides an interesting way for students to practice and become more familiar with finding factors of a given number. It is also useful when teaching reducing fractions to the lowest terms.

Directions:

All students are to stand alongside their desks. The first student announces a number from 1-100. For the remainder of the game, all students must avoid mentioning any factors of that number as they count off, stopping when they reach the given number. If it is a factor of that number, instead of saying the number aloud, the student must snap his/her fingers.

Sample game:

If "12" is the given number the activity would sound like this: First person - snap, second person - snap, third person - snap, fourth person - snap, fifth person would say 5, sixth person - snap, seventh person would say 7, eighth person would say 8, ninth person would say 9, tenth person would say 10, eleventh person would say 11, twelfth person - snap. Then the thirteenth person would announce a number from 1-100 and the game would continue.

EFFECTIVE TESTING

Sister Barbara Hudock

How do we know if our children are learning? How do we evaluate learning in our schools as they now exist? Our schools are designed so that teachers teach a given curriculum and students are tested on their retention of the knowledge that was taught. Curriculum and testing are the basis for our children's education. But what does that have to do with thinking? Do we teach children or a curriculum? Does testing tell us enough about what children have learned?

Teaching the curriculum and testing students on that information is not always an accurate means of evaluating. It has been said that there are three curriculums in any given classroom:

1. the curriculum given in the textbooks
2. the curriculum the teacher teaches, and
3. the curriculum the students actually learn.

On which curriculum is the student tested? When a child does pass a test, how can we be sure the child comprehends what was taught? It is possible that the student does not understand the material on the test but is able to repeat it. If students are able to duplicate information but do not comprehend what they are able to duplicate, how long will their retention last? With these variables in mind, can we be sure that our children are learning?

Testing in schools needs to include more than written answers that duplicate the material which has been discussed. When we say a child learns something, we expect them to show some understanding of what has been taught. Piaget's theory of learning says that children need to reconstruct reality in order to learn. Children must have a chance to apply the information they have learned in some way. To evaluate learning, the teacher needs a way to observe a child's thinking so that the teacher can better understand what the child has comprehended. Essays, projects, creative demonstrations are all possible forms of testing that allow the student and the teacher to communicate what has been learned. Time must be spent observing children using what they have learned in order to know if children really understand what has been taught.

MY TERRIBLE SECRET

Julie Howell

"Another paper was returned to me with a great big "F" scratched across the top. What is wrong with me? Am I stupid? Why can't I get a good grade in math? Dumb! Dumb! Dumb!"

This was a description of me in the fourth grade. I succeeded well in every subject except math. The problems all started when they forced us to memorize the multiplication tables. I, for the life of me, could not memorize the 7's, 8's, and 9's. I studied, studied, and cried but nothing would get those 7's, 8's, and 9's in my head.

Then we moved into double digit multiplying and I got more lost. Every sheet I did came back with F's marked on them. My teachers insisted I wasn't trying, my friends insisted I was being stubborn, but I was just becoming more and more frustrated.

By now you may be wondering what the problem was. How can a student who had been successful in math doing adding and subtracting suddenly become unsuccessful in multiplying.

It really bothered me until it dawned on me that I didn't see numbers the same as everyone else. When people read 18, I saw 81. I didn't read single digit numbers backward, it only happened with 2 digit numbers. When I went back to adding I found that the 2 and 3 digit numbers were now backwards also. I know they weren't backwards earlier. Something had gone wrong.

From that point on, I had to switch all the numbers around to make my problems come out right. I began to do better on my tests and work, but whenever we had timed tests I still did poorly.

To this day I have to turn my numbers around. My brain now almost always switches the numbers automatically and only when I am tired do I have problems.

I never told anyone about my problem until about 3 months ago. My parents don't know, my friends don't know and my teachers don't know.

I finally decided to try and analyze why this problem came about. After talking to several professionals it was decided that my number dyslexia was prompted by the forcing and anxiety of learning the multiplication tables.

If this is the case with me, and I have an irreversible problem, what are we doing to children by forcing them to memorize multiplication tables. We have computers and calculators to do most of our work in multiplication. It isn't necessary to put children through the horrors of memorizing entire sheets of multiplication facts.

The important parts of math are teaching children to problem solve, teaching children to estimate, making sense of what is being taught, and teaching children how math is used in life. Inflicting psychological damage is not part of mathematics.

THE SUCCESS OF THE HIDDEN LLAMA

Janet Kallal

My first grade class and I had recently trudged through the chapter in math covering geometric shapes and bar graphs. This series stresses the terms "corners" and "sides" to define shapes. I wasn't sure if my class had gained any new knowledge or understanding at its conclusion, but I am confident now.

I introduced the activity "Hidden Llama," with some reluctance. I feared that my class didn't have enough background knowledge to gain confidence in the activity. I was surprisingly amazed.

Game Rules: "Hidden Llama" is played on a 5 X 5 grid. Number the boxes on the grid to give ease in locating the llama.

One person, the leader of the game, determines the llama's hidden location. The other players try to guess the location by asking the intersecting boxes. As a class we decided to call the number across first then the number of the box up from that point. If the side of the guessed location is touching the llama's box, the leader writes an H, for hot, on the guessed box. If the corner is touching the leader writes W for warm. But, if no side or corner of the guessed box is touching the llama's box, the leader writes C, for cold.

My class used the terms "corner", "side", and the skills learned in bar graphing to enjoy this activity. The students were very confident in their guesses and continued to guess, with a pattern to their guessing. I felt that this activity was very beneficial. It not only reviewed the terms of side, corner, and bar graph skills, but let them think.

This activity is also a good car activity for restless riders. To modify the activity for car riding use a laminated grid and markers or plastic markers. Then watch their logical thinking grow.

*(Editors Note: This game and others like it are available on the computer game **Safari Search** by T.C. O'Brien, available through Sunburst.)*

FRACTIONS AND PIAGET

Karen Purkaple

Piaget believes a child's cognitive development is based on four kinds of operations. One of these operations, reversibility, is strongly linked to another operation, conservation. Conservation deals with the child's ability to realize the differences between appearance and reality. Piaget's classic example is the young child who believes that a taller and thinner glass contains more liquid than a shorter, fatter glass, even though the child has watched as the water was poured from the short to the tall container. When the child can realize that the water poured back into the short fatter container is the same amount, he has accomplished the operation of reversibility.

I asked Kristy, a sixth grader who was experiencing trouble reducing fractions, to work with me with a bead string consisting of ten sections with ten beads in each section. I asked her to find 1/10 of a section. She showed me one bead. I asked her to find 1/10 of the whole string. Kristy was slower about this process and had to think for awhile before producing ten beads as the answer. Next I asked her to find 2/10 of one section. She showed me two beads. Then I asked her to find 1/5 of the section, and she was completely confused. She made several guesses but could not conceptualize that 1/5 was the same as 2/10. Kristy was lacking in the cognitive operations of conservation and reversability.

Before a student such as Kristy can perform calculations with fractions, he/she needs a strong structure of experiences in conservation and reversibility. If a child's cognitive development is not at a stage where he/she uses reversibility operations, perhaps his/her introduction to fractions needs to be postponed.

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1969.

p. 238
"The principal goal of education is to create men who are capable of doing new things, not simply of repeating what other generations have done -- men who are creative, inventive, and discoverers. The second goal of education is to form minds which can be critical, can verify, and not accept everything they are offered. The great danger today is of slogans, collective opinions, ready-made trends of thought. We have to be able to resist individually, to criticize, to distinguish between what is proven and what is not. So we need pupils who are active, who learn early to find out by themselves, partly by their own spontaneous activity and partly through material we set up for them; who learn early to tell what is verifiable and what is simply the first idea to come to them."

p. 226
"Interest and learning are best facilitated if the experience presented to the child bears some relevance to what he already knows, but is at the same time sufficiently novel to present incongruities and conflicts."

p. 225
"It is seldom legitimate to conceive of knowledge as a thing which can be transmitted. Certainly the child needs to learn some facts, (these may be considered things). Sometimes, drill or programmed instruction may assist in learning of this type. But often the child does not learn even facts when imposed; the student may have to discover them himself."

p. 225
". . . facts are but a small portion of real knowledge. True understanding involves action, on both the motoric and conceptual levels."

p. 224
"The concept that children -- or individuals of any age -- learn best from self-initiated activity is perhaps the most important single propositions that the educator can derive from Piaget's work."

p. 223
". . . the young child is quite different from the adult in several ways: in methods of approaching reality, in the ensuing views of the world, and in the uses of language."

I think this quote is especially important because so many people think of children as little adults!

p. 218
"Learning in the narrow sense involves the acquisition of new information or new responses restricted to a specific situation... learning in the wider sense, or development,

involves the acquisition of general thought structures which apply to many situations."

pp. 106-107
"Piaget found that young children seldom express casual relations. In describing some mechanical device, the child merely says that a and b occurred; he does not say that a caused b. Instead of being related one to another, the two events are merely juxtaposed, that is, placed one after the other."

"Here are some examples {of juxtaposition}:

. . .the man fell from his bicycle, because he broke his arm. . .
I had a bath, because afterwards I was clean. . .
I've lost my pen because I'm not writing. . .
He fell off his bike, because he fell and then he hurt himself. . ."

p. 87
In regard to Piaget's term egocentric... "Piaget does not use the term in the sense of selfish or self-serving. The young child is characterized as egocentric not because of conceit or because of an attempt to satisfy desires at the expense of other people, but because he is centered about himself (or his own ego in the general sense) and fails to take into account the other's point of view."

There is so much information in this book! I think these quotes cover some important issues and can give others a taste of what the book is about. I wanted to use the descriptions of Piaget's use of egocentrism because I believe many people automatically think of selfishness when they hear the term, without thinking about its educational implications.

If a child is egocentric, it is easy to see how he would have a difficult time learning what is fed to him by a teacher. I think a teacher's responsibility to this type of child would be in giving the student a problem with several solutions. After the child finds one solution, the teacher should direct the child so that he can realize there are others.

"HOLY, HOLEY CARDS!"

Marcia Anderson

In my Field II classroom, I witnessed the terrible stress that is placed upon children in today's schools. At 12:45 p.m. the students were instructed to take out their holey card, a piece of paper, and a pencil. They had to do this in 20 seconds. The 20 seconds was orally counted down by the teacher. Also, in this 20 seconds, they had to fold their paper, put it inside the holey card and wait for the teacher's magic bark. "Go!" Shouted the teacher.

What I saw at this moment was a look of total frustration and incompetence on the children's faces. There are about 50 multiplication problems with a hole below each one. In this hole you write the answer to the problem. The student's grade is based on his/her improvement from one day to the next. You have to do at least one better each day. Are the children really learning how to do the multiplication facts, or are they learning how to cheat by looking inside where the answers are listed, or by looking at someone else's answers, or by not getting their things out in 20 seconds and getting a 0 that day?

When the time limit is over the children fold the card inside out and check their answers with the correct ones. Many times I have observed children checking their papers with their erasers instead of a pen. What does this show you about what the children are actually learning? They are learning about frustration, anxiety, fear, aggravation, despair, and most of all they are learning about stress, and that is very unhealthy for children. They are also learning how to cheat to receive a desired goal.

Is this really helping children learn their multiplication facts? I don't believe it is! I feel it is furthering negative feelings toward the subject of math. I feel that the holey cards cause too much frustration and place too much pressure on the children. This exercise inflates the attitude of the children who can "do it all". However, for the children who don't know their facts, it places them deeper into a hole and they feel less confident than ever. Is all this stress, anxiety, frustration, and low self-esteem really necessary?

FAILURE AND THE HANDICAPPED CHILD

Pam Hillmer

Handicapped children experience failure throughout their life. When parents first realize their child is defective or not normal the first stage of failure begins. Parents undergo feelings such as; What did I do to cause this child's handicap. The second stage of failure encountered by the handicapped child is with peers. They have problems being accepted. Children that are different than the norm seem to have difficulty in social situations. When an exceptional child is shunned by their peers, they develop a poor self concept. This poor self esteem is the third stage of failure experienced by the handicapped child. At this stage the child seems to give up and accept the failure.

Most of the educational process deals with success or failure. Educators need to realize the above failures experienced by handicapped children, and create experiences where these children can encounter some success. Success leads to a positive self concept, which enhances students to explore learning and social situations instead of withdrawing. When handicapped children begin feeling success they get an "I can do it attitude." Everyone needs success -- not only handicapped students. Education should start leaning towards success and away from continual failure. Although success is important, educators must not overestimate the success oriented program. Over simplification can be as harmful as continual failure.

DYSLEXIA'S CAUSE REPORTED FOUND

Reprinted from **THE NEW YORK TIMES:**
January 13, 1987

Many factors have been offered to explain the reading disorder dyslexia, among them impaired vision, head injuries, inner-ear disorders and even laziness.

But now researchers studying the brains of dyslexic people have discovered a pattern of cellular and structural abnormalities that suggest the reading disorder is actually caused by abnormal prenatal development of the brain.

As a result, doctors may soon be able to identify children with these abnormalities and recommend special tutoring or treatment to prevent failure in school.

"If we know how the brain works, we can design textbooks that take advantage of dyslexics' intellectual abilities and minimize their intellectual deficits," said Albert M. Galaburda, a neurologist at Harvard Medical School.

While the severity and symptoms of dyslexia vary, its victims generally have problems perceiving shapes of words. Letters appear to bob and weave on the page, sometimes dancing off the edge, other times transposing themselves. Dyslexia is unrelated to intelligence. Thomas Edison, Albert Einstein, Winston Churchill and Woodrow Wilson are all believed to have been dyslexic, and 5 to 15 percent of people have a reading disability, the majority of them being dyslexic.

Many of the recent findings about the brain and dyslexia are coming from work by the Harvard Medical School Department of Neurology at Beth Israel Hospital in Boston, where a "brain bank" was established in 1982 by The Orton Dyslexia Society, an advocacy group.

COMPARISON OF BRAINS

The new research has focused on the interplay between the two hemispheres of the brain. Comparisons of brains from dyslexics and non-dyslexics supports the theory that reading difficulties result from abnormal organization of brain functions.

The right side of the brain normally dominates activities such as art, music, and mathematics, and the left side normally controls verbal activities such as writing and reading. Although there are language areas in each hemisphere, in most people, the language areas in the left hemisphere are larger and more developed at a cellular level.

Studies by Dr. Galaburda at Beth Israel Hospital in Boston and other neuroscientists have shown that in brains of dyslexics, the language areas in the right hemisphere were as large as those in the left, and the right hemisphere also contained a greater than normal number of brain cells. Researchers theorized that a more developed right hemisphere would be able to rival the left hemisphere for control of the language function, creating tension within the brain and distorting the reading process.

Researchers believe this disorganization of the brain could be caused by abnormal development and alignment of brain cells in the second trimester of pregnancy when the fetal brain forms the outer cortex where thought, language and other higher functions reside. This process involves the migration and interconnection of billions of cells.

Researchers say cellular disarray leading to dyslexia could result from subtle injury to the fetal brain as from a small stroke, maternal stress or a virus. Another possibility is prenatal variation in testerone, a male hormone which alters the way the brain takes shape. Far more boys than girls are dyslexic.

MAPPING BRAIN WAVES

Other brain-related studies are being conducted at Boston Children's Hospital where Frank Duffy, a neurologist, is mapping brain waves of dyslexic children in response to sounds, sights and words. Using an electrical mapping device, Dr. Duffy wants to establish imaging techniques to identify children at risk of dyslexia.

So far, Dr. Duffy has found differences in the brain's electrical activity in people with dyslexia. The differences were found not only in the left hemisphere, where they were anticipated, but in both medial frontal lobes and in the occipital lobe, the brain's visual center. Dr. Duffy said these findings suggest dyslexia is "a rather comprehensive abnormality of entire portions of the brain."

Whether brain research can lead to treatment for reading disorders is unclear. "There is a huge leap from discovering physical abnormalities in the brain to an explanation for educational underachievement," said Richard M. Restak, a Washington neurologist and author of two books on the brain.

Part of the problem is the sheer complexity of the brain. Another problem, experts say, is that reading is a "culturally imposed" function.

"The brain is not biologically programmed to learn to read." said Diane McGuinness, a psychologist at the University of South Florida and author of a book on learning disabilities. "In order to learn to read, several sensorimotor operations must be coordinated in the brain. It is these functions that are properties of the brain, not reading per se."

In reading, Dr. Galaburda said, "we use parts of the brain that have evolved to be used for other things. Some people cannot roller skate, he said, but that does not mean they have defective feet. It means that the feet, like the brain, evolved to perform other tasks.

Remedial instruction for people with dyslexia usually involves intensive counseling and the use of visual and tactile aids. This multisensory approach compensates for dyslexics' difficulties with the traditional phonetic approach to reading.

The challenge for the future, Dr. Galaburda and other experts say, is to discover reading disorders early and to develop better remedial teaching techniques to ease children with dyslexia into the world of words.

MATH ANXIETY
Linda Dabbs

Students panic over math just because they have heard it's difficult. But that's a myth. Math isn't harder than any other subject. It's different but it's not harder. When students enter the junior high, it is their first experience at having a math major as a teacher for math class.

On the first day of class a discussion about what anxiety means and some of the myths that concern math should be conducted. Examples of these myths: You need a special "math mind." Boys are naturally better in math than girls. If you work math slowly, there's something wrong with you. There is one correct way to do each math problem.

The "math anxiety" test, modified from the September 14, 1984 issue of **"Scholastic Math"** is then given. This test uses a scale of 1 for disagree to 5 for agree. The following statements are made and the student needs to reply with a one to five answer.

1. I hate math.
2. Math isn't tough now, but it's going to get hard very soon.
3. I tune out in math class.
4. I really don't like asking questions during math class.
5. I panic when called on in math class.
6. I worry about math tests more than any other kind of test.
7. I can't wait until I'm old enough to quit math.

If the total point value is 21 or above, they have math anxiety.

Now what can be done to cut down on this anxiety? First, students need to realize that they are not alone. Even mathematicians now and then get that sinking, panicky feeling called "math anxiety." If students have trouble, they need to practice a little each day and be sure to ask questions. Some students think asking questions is a sign of weakness. It's not. It's a sign of strength. Watch handwriting when you do math. The sloppier it gets, the more confusing the problem becomes. Watch zeros that look like sixes. But most of all get help. Everyone needs help now and then.

Since using this approach on the first day of class, students see the math teacher as a human who knows that not every student enjoys the subject that the teacher enjoys. It opens the door for a closer relationship with the class and a better learning environment.

CAFETERIA MATH - FOOD FOR THOUGHT

Wanda Darby

A cooperative cafeteria staff can be a gold mine of information for some interesting math exercises.

Arrange for students to spend a class period in the cafeteria either before or after the busy lunch break.Assign groups of students to gather statistical information from the cafeteria staff or through observation. Ask for statistics such as:

1. The number of students who bought school lunches during 1 week.
2. The number of half-pint cartons of milk sold on a given day.
3. The number of straws used each day; the length of each straw.
4. The number of pounds of spaghetti the cafeteria serves on a given day; the weight of a pound of uncooked spaghetti; the estimated number of uncooked pieces in a pound; the length of a single piece of spaghetti.

The next day, make the information available to all students by listing it on the blackboard or distributing it on a ditto. Then ask students to use the information to figure out problems such as these:

1. If individual pieces of spaghetti were placed end to end, how many miles of spaghetti would the cafeteria have served on a given day? (Students will need to add, multiply, and divide to come up with the answer.)
2. How many gallons of milk were sold in the cafeteria on a given day? How much will have been sold at the end of the school year?
3. How many feet or yards of straws will be used during the school year?

Besides helping students apply math skills practically, the activity gives students a new perspective on another aspect of school life!

REWARDS ARE REWARDING

Becky Crawford

Toward the end of the school year, everyone starts to feel restless. In First Grade many children tend to redevelop some of their old, bad habits they had at the beginning of the year like inattentiveness, tattling, etc.

All year I stress being fair to each other. When two children are having an argument, we try to go back to the start of the problem and they have to work it out--I mainly just watch and listen. However, when spring comes, they all start getting more testy.

I began teacher helper awards which have helped curb this trend and help end the school year on a happy, positive note. The chapter in Kamii's **CHILDREN REINVENT ARITHMETIC** on autonomy and heteronomy made me realize just how important this activity might be.

During the middle of April, I tell the class about the awards. They decide on a name (we've had Road Runner Awards, Snoopy awards, Big Bird, Winnie-the-Pooh, and others they've thought up.) I make a laminated badge for each one to wear on their day.

Every afternoon, about twenty minutes before school dismisses, we stop to nominate and vote for the next day's awardee. We have fairly involved discussions a few days before the awards start on not picking or voting for your best friend or voting because someone told you to. We practice watching each other for good things they've been doing or watching for bad things they haven't been doing lately.

When the awards start, three children are nominated from the classroom by fellow classmates. When a nomination is made, the nominator has to give three reasons why they think they'd be a good helper. I write the reasons on the board verbatim. We do this for two others. Then the present teacher helper reads all of the candidates names and their three reasons and passes out ballots to everyone. The helper tells everyone to vote, fold the paper and bring it up to the teacher helper's desk (which is next to mine.) When all votes are in, everyone sits quietly (as much as possible considering the excitement!) while the votes are counted. Then the helper writes the totals on the board next to each name. After each total is written, we figure how many votes are left and many predict an early winner! Toward the end, most teacher helpers start with the smallest total to keep the class from guessing too soon! In case of a tie, we go through the process of balloting again between those tied. Each child can only be a teacher helper one time. The three reasons given for nominations usually get better as we get into it and the old teacher helpers usually are good nominators because they're not under pressure to win and can sit back and look at what the others are doing.

Once the winner is known, I take his or her picture with a polaroid and mount it on a long strip of construction paper along with their name and the three reasons that were given for their nomination. Then it goes out on the wall in the hall by our door. It becomes a talked about item throughout the school.

The day they are my helper, their desk is by mine, they grade some papers, call lunch tickets and money, lead the pledge, give a taped weather report, take care of the calendar, line up first and many other other jobs. The jobs vary.

Through all of this, the idea of thinking for themselves and noticing what is going on around them is very important. We sometimes just stop and have a talk time, especially when someone notices that something good has happened to another student. This is a good activity to end with each day and it does make the class work together constructively right up to the last day!

I CAN'T TURN MY BACK

Catherine Fickert

I can't turn my back on what I have learned in Field II classroom observations. Children don't come to school like little empty buckets for us to fill up with math blocks, writing blocks, reading blocks, science blocks, etc. They are each separate, unique individuals looking for ways to organize and make sense of their world.

Children are actively learning all the time, and when they start school they have already learned and constructed from their environment. They are constructing, predicting, accommodating their world from birth, not just from the first day of school. I want to be aware of and "tuned to" where they are in their developmental growth.

I can't turn my back on the importance of giving children opportunities to experiment, explore, discover, becoming actively involved in learning and making sense of their world. I want to help them in their construction and I want to learn with them.

I have learned so much. After discussing the value of allowing children to use their fingers to count, I did a lesson with my Field II second grade class on poetry. I was at the board giving examples of cinquain which stresses certain numbers of syllables in each line. I very comfortably and freely used my fingers to count the syllables. Before being made aware that it is all right to use my fingers to count, I would have hidden my fingers behind my skirt or in my pocket as I wrote the cinquain on the board and counted the syllables.

One of my most important jobs will be to help students be in charge of their world. I want to make opportunities available that will give them confidence; help them know they can learn! One way I find helpful is encouraging them to predict, helping them find patterns with numbers, so they can be comfortable and in charge of numbers and not fearful of them, if they previously found numbers unpredictable.

I am no longer ignorant as to how children construct and have a need to organize and make sense of their world. I can't turn my back and continue in ignorance. Ignorance is destructive not constructive! I have a responsibility to myself and my students to continue to grow in knowledge of myself and my student, being open to new opportunities to help them accommodate and grow in confidence. The more children learn and understand, the more confidence they have in themselves. If we adults are aware of the tremendous need for self-esteem in ourselves and children, then it is up to us to do all we can to help children grow in self-esteem

I can't think of a better way to help children develop self-esteem than to give them daily opportunities to learn, understand, succeed, predict, find patterns, accommodate, organize, grow in confidence. Maybe the key is attitude. I hope I can continue looking for the good, sharing the good, as with the suggestion given in class to call each parent at least once a month to share something positive their child has accomplished. What a powerful suggestion. ***Thanks!***

I feel it is almost a moral responsibility we have to our children as well as to ourselves to do our very best as parents and teachers. It's not always easy but the more I grow in awareness and "professional consciousness", the more I can reach out and be there for students.

TESTING: ARE THEY REALLY WRONG?

Tracey Rubemeyer

Most often we test with worksheets. "Here's the test--do it." How convenient. Now all we have to do is check the answers - right, wrong, right, wrong - and so on. Done. Right? --- Wrong? What about those who got the wrong answers? Do they really not know the answers? This brings about the subject of oral testing.

Oral testing has many more benefits than worksheet testing. It allows us to probe the child to find out what he's really thinking. Often children misinterpret the question we ask and hence give an incorrect answer. For example, if you give a child a number line such as 17, 20, 23, ___, ___, ___, and ask what comes next, they may not understand the question while understanding the concept. If you are giving it to them orally, you can explain fully so the student does understand. Often, examples are needed.

When you feel a child is comprehending but repeatedly scores low on tests, try testing orally. Often the problem is in the question. And, when preparing questions, be more conscious of the way you write them. Just because you understand, doesn't mean the students will.

PLACE VALUE IN FIRST GRADE
Averyl D. Mueller

Year after year you hear First Grade teachers say....Oh, NO!! We're ready to start working on place value! My students never understand place value! Here we go again! An interesting observation made by skilled professionals for we go on year after year trying to impart this knowledge on our students when we know they are not ready for place value at First Grade level.

A place value "child watching" experience that I observed closely correlates to teacher's views and the ideas presented in **YOUNG CHILDREN REINVENT ARITHMETIC** (Chapter 4) **NUMERALS AND PLACE VALUE AS OBJECTIVES** by Constance Kamii.

THE TASK

After doing much previous work with place value, the students were given the number 24 and asked to---Draw what the 4 means---Draw what the 2 means---

FINDINGS

Fourteen of sixteen students---The 4 means objects (cats, dogs, etc.) and the 2 refers to 2 objects (cats, dogs, etc.).

They see the number 24 as a whole. They can tell you they need 24 objects for the number. But when they are presented with parts of the number, they will give you the specific amount for each individual number.

Place value results in much confusion and is almost always presented far before their math construction scheme is developed to a level that can successfully include place value. So, why do we continue to present place value in First Grade? Do we really want our curriculum to consist of confusion, despair, frustration and skills that logically have no constructive benefit when presented at this level?

ADAPTION AND INTELLIGENCE: ORGANIC SELECTION AND PHENOCOPY BY JEAN PIAGET

Book Review by Pat Hays

ADAPTATION AND INTELLIGENCE by Jean Piaget is a comprehensive study relating the adaptability of simple organisms to the intelligence of more complicated organisms. Piaget explains that some factors in an organism are conserved while other factors are flexible. This flexibility accounts for the observable modifications of the phenotype as it acts on the environment. These organic modifications are similar to the behavior modifications of a more complex organism as it also acts on its environment. Both processes result from a synthetic process or from the organism's ability to act from within to construct responses and behaviors to external factors.

The phenotypic adaptation is a product of interaction between the environment and synthetic processes. The phenocopy is a genotype which has yet to appear which means that the phenotype has actively sought out modifications which have been imposed by the environment but are consistent with the heredity program. Piaget explains this operation of organic selection as more than just a reaction to environment but rather as a system of choice and exploration. Thus the phenocopy is a construction of the organism which conserves heredity programming while economizing change and improvement. This exploration will continue until a sufficient state of equilibrium is reached.

Piaget relates the functions of a phenocopy to the functions of intelligence in that the structures of intelligence are also the result of long periods of constructions. These constructions are not drawn from external objects but arise from internal logical mathematical activity which involves the coordination of the individual's actions on the environment. Intelligence is a subjective and personal progression in that each organism must make sense of his environment by drawing on his own experiences and understanding. The organism or individual moves constantly towards equilibrium as he confronts new problems and is exposed to various external stimuli. All new knowledge presupposes the existence of old knowledge and continues to construct upon this preexisting reality, and thus never constitutes an absolute beginning.

The reality of life for the simplest organism to the most complex is that states of disequilibrium will be imposed upon an organism or individual. Each living being possesses within itself the ability to act on this disequilibrium. So, for Piaget, the very essence of life itself is the internal ability of an organism to construct new responses and behaviors in order to act on external stimuli rather than submitting to them.

I SEE SOMETHING

Shirley Schultz

This is an activity we started when our children were very young. When I began teaching I found many opportunities to apply it to the classroom. It can be changed in many ways and can be exercised anywhere because you only use the surrounding environment.

For young children; you can begin by using color words as "I See Something Blue." You can start with objects in an enclosed space, enlarging the scope to offer more interest and problem solving as they become more adept.

We have found this activity to be very good for identification, matching and labeling. As our children became older, they initiated the item or concept to be sought.

We did this in the car, restaurants, doctors' offices, etc. It proved to be a rewarding activity whenever we were put on "wait" for an appointment.

This game can be used for any subject area. Some of the following areas are suggestions for use. Many of the suggestions have been initiated by my own children.

These can be individual or group participation. Actually the activities are endless. You can also learn a lot from the student who is the "I See Something" spokesperson. This is an activity which I feel offers much for all involved. It can begin at a concrete level and grow into the abstract.

SUGGESTED ACTIVITIES

Colors - Naming, matching

Shapes	- I See Something SQUARE - I See This Shape Many Times In one Place
Furniture Classification	- Sleep on, sit on (begin with whole range approach, then move to a specific quality)
Textures	- Soft, hard, rough, smooth
Size	- Biggest, smallest, largest, littlest
Positional words	- Under, over, first, last, third
Readable items	- Area you can specify - library, through the mail, handwritten
Plastic, wood, metal	
Squares within rectangles	
Combinations of shapes, colors, sizes, etc...............	

This activity can be used when a teacher has just a few minutes before lunch, etc. It can make this time a rewarding, learning time for children and adults.

MINI-MAPS AND MATH

Wanda Darby

Turn your out-of-date road maps into opportunities for your students to combine map and math skills.

First, cut the road maps into 11 X 16 inch sections and glue each section across the inside of a file folder. Around the edge, mark number and letter coordinates for locating cities

For each map, prepare tasks similar to the following examples:

(A) Which city in section E-4 has the most highway routes leading into it?

(B) If you drive from Riverton (G-3) to Leadville (F-3) and then to Burnt Hill (E-6) about how many miles will you travel? (Use the scale of miles on the map's highway mileage marker)

(C) You live in Lewis (A-9). You commute 5 days a week to Nill (G-2). How many miles do you commute in 3 weeks?

(D) You rent a car in Tuckertown (E-8), drive to Lake Dawn (B-7) for a picnic, then drive back to Tuckertown. How much will you have to pay for car mileage at $0.20 per mile?

Place a task card and an answer card in a pocket attached to the outside of each folder, and store the folders at an independent activity area.

Encourage students to add their own map-reading tasks once they've completed the ones you've provided.

PROBLEMS THAT CONTAIN WORDS

Debbie Hefferly

Word problems are real life, everyday situations. Most students hate word problems. No wonder. They do not give a set formula to follow. The student must think and reason for himself. Everything students do in math is a formula. How dare we teachers give those poor students something in math that they have to think about!

Addition, subtraction, multiplication and division are presently being taught (in most cases) by rote memory and problem solving formulas. The curriculum does not teach children how to apply this knowledge to everyday situations. This again proves that our present curriculum is failing and that changes are in order.

Mathematics education should generate "logical mathematical knowledge." What mathematic education is generating, in most cases, is "computational ability." Logical mathematical knowledge is very important and is needed to do word problems. In fact, it is needed in everyday life.

A curriculum based on an active learning approach would produce this logical knowledge. This approach would provide a variety of real life experiences, thus the children will know why they are adding, subtracting, multiplying, or dividing.

In order for students to become more effective with word problems logical mathematical knowledge is a must.

THE A B C'S OF TEACHING

Janet Kallal

A teacher has many roles. Some teachers have more roles than others, depending on the grade level, community, and administration expectation, location, and size. You may be called upon to perform many jobs that never occurred to you to be in the teaching realm. This is the list of jobs that I have compiled.

A **Acccuntant** - A person that completes book orders and tabulates money for lunch, milk, field trips, and after school spending money.

B **Book binder** - Someone that repairs books and torn papers.

C **Counselor** - One who listens to problems and sometimes gives suggestions to help the child, children, adult, or adults work them out.

D **Detective** - Someone that solves mysteries of the lost pencil, crayon, paper, book, coat, or money.

E **Educator** - A person that helps others learn more.

F **Friend** - Someone that students and colleagues can respect and trust.

Facilitator - Someone that helps to make the risk taking of learning easier.

G **Guide** - A person that can help people find solutions and new knowledge.

H **Helper** - Someone that leads without answering directly.

I **Investigator** - A person that questions and challenges others.

J **Juggler** - One that can balance the school day to include all the required subjects plus time for the unplanned activities.

K **Knitter** - One that helps children intertwine their experience with the world of knowledge around them.

L **Learned** - Someone that continues to question and examine materials and approaches to gain knowledge.

Listener - A person that gives heed to what is being said and takes into consideration the mood and context in which the words are being spoken.

M **Motivator** - Someone that questions and encourages Students.

N **Nurse** - A person that feels heads for the determination of fever, consoles upset stomach aches, give aide to cuts and scrapes, or ask for help if more serious treatment is needed.

O **Observer** - Someone that watches reactions and solutions others have that urge them on.

P **Prospector** - A person that researches materials to help others learn.

Q **Qualitator** - One that organized information into precise bits of knowledge that are understandable.

R **Recorder** - One who writes down records such as: attendance, grades, attitudes, and mastered skills.

Referee - A person who oversees and calls plays whether in games, lessons, or fights.

S **Self-image** - Ones' knowledge that what you are doing has worth and your belief in its value.

T **Teacher** - Someone that gains enjoyment in watching students grow in wisdom and knowledge.

I hope that you have gathered from my article that a teacher is more than a video cassette of knowledge, ready to demonstrate it. A teacher challenges, guides, observes, and evaluates to help students increase in their knowledge, skills, and interests. A teacher must perform many roles in order to obtain this goal.

FABLE OF THE ANIMAL SCHOOL
G. H. Reavis

Once upon a time, the animals decided they must do something heroic to meet the problems of "a new world," so they organized a school. They adopted an activity curriculum consisting of running, climbing, swimming, and flying and, to make it easier to administer, all the animals took all the subjects.

The duck was excellent in swimming, better in fact than his instructor and made passing grades in flying, but he was very poor in running. Since he was slow in running, he had to stay after school and also drop swimming to practice running. This was kept up until his web feet were badly worn and he was only average in swimming. But average was acceptable in school, so nobody worried about that, except the duck.

The rabbit started at the top of the class in running, but had a nervous breakdown because of so much makeup work in swimming.

The squirrel was excellent in climbing until he developed frustration in the flying class where his teacher made him start from the ground-up instead of from the tree-top-down. He also developed charlie-horses from overexertion and then got a C in climbing and a D in running.

The eagle was a problem child and was disciplined severely. In the climbing class he beat all the others to the top of the tree, but insisted on using his own way to get there.

At the end of the year, an abnormal eel that could swim exceedingly well, and also run, climb, and fly a little had the highest average and was valedictorian.

The prairie dogs stayed out of school and fought the tax levy because the administration would not add digging and burrowing to the curriculum. They apprenticed their child to a badger and later joined the groundhogs and gophers to start a successful private school.

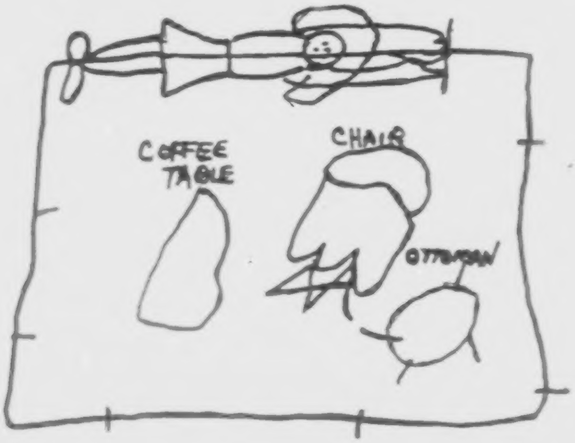
Published in **CLEARING HOUSE**, 1937.

SISTERS

Catherine Fickert

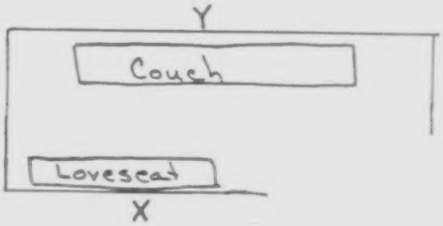
I was sitting in my living room with my two daughters: Mary age 7 and Jamie age 5. I asked them if we could measure this room and see how big it is even if we did not have a ruler. Mary said that if we knew how tall she was we could measure this room; she could lay down and we could count how many of her it took to make a wall. I asked Jamie about this and she got angry and said, "No! There aren't enough Jamies and Marys!"

When Mary heard what Jamie said, she immediately got a sheet of paper and a pencil and drew Jamie the following picture:



Jamie listened to Mary explain how Jamie could lay down and mark where her hands and feet were and keep going around the room doing this. Jamie seemed to understand and when I asked if it would take more Jamies or more Marys to measure the room, Mary said it would take more Jamies because Jamie is smaller. I asked Jamie this same question and at first she was not sure and then she said it would take more Jamies. When I asked her why, she said, "because I'm littlier."

We next proceeded to measure two walls of our living room. Here is a sketch of the walls we measured:



Mary started first on wall "x" behind the loveseat and Jamie could not see her. Mary lay down as she illustrated in her picture by putting her arms above her head, placing a butter knife at her finger tips and a butter knife at her toes, she proceeded to measure "x" wall. When I asked Jamie to come measure "x" wall she lay down, with her arms at her side! This surprised me. Then Mary looked at me and decided she better lay down with her arms at her side and remeasure that wall, since we decided we could use this measurement if we knew Mary's and Jamie's height. Mary remembered that height is measured from the top of your head to the bottom of your feet.

Mary and Jamie measured "x" wall and came up with 2 Marys and 1 of Mary's hands and 2 Jamies and another part where Jamie crouched on her knees and arms to fit into. Mary showed Jamie that the space left was about one half Jamie and Mary lay on the floor with her legs straight up to show one half.

Then they decided to measure "y" wall, and when I asked them which wall they thought would be longer and immediately Jamie said "'y' wall because the couch is longer than the loveseat." Mary said, "'y' wall" and went over to "y" wall and showed me how it extended farther over than "x" wall.

After they measured "y" wall and it proved longer than "x" wall, Mary wanted to keep measuring these two walls so she decided to measure "y" with her feet. Mary found the wall was 20 of her feet long and she predicted it would be "maybe 20 something of Jamie's feet long." When Jamie went to measure the wall with her feet, she stood facing the wall, feet together, ready to measure. Mary helped her turn and measure going heel, toe, heel, toe, etc. with her feet. When Jamie completed measuring the wall with her feet, Mary said with satisfaction, "little over 21 of Jamie's feet."

They were really enjoying this measuring and comparing but were ready to stop after they measured walls "x" and "y". Next time I will have them measure the entire room. Later I had a ruler and asked Jamie if she wanted to measure the long side of our coffee table. She set the ruler on the edge and said "30" (she saw the 30 cm mark) and I asked her if she could measure this the same way we measured the walls earlier and she said "no, cause I can't climb on the table." Then I asked her about how she had marked the wall and she lit up and said "oh, I can mark it." I got the same butter knives and she measured the table with the ruler. When she got to the end of the table and there was a little left, she said, "that piece doesn't count because the ruler doesn't fit." I also asked Mary to measure the coffee table and she simply lay the ruler along the edge, marked the end with her finger, picked up the ruler and continued measuring. She got a piece of paper and added 30 plus 30 plus 30 plus 7 and got 97 cm.

What an interesting experience this was for me. I watched these two sisters help each other as, for example, when Mary drew the picture for Jamie to show her how they could measure the room. Jamie also helped Mary when she lay down with her arms at her sides to measure the wall.

Children seem to enjoy measuring and comparing; these two girls sure were having fun and I was having fun watching them. It was easy for me to see that Mary was more into Concrete Operational, as she was more flexible, she was more decentrated, and she could focus on more than one aspect of a situation at a time. She could see how she could measure the wall with her body and her feet, even though there was only one of her, and she could see that "y" wall was longer than "x" wall not just because the couch was longer than the loveseat. Jamie seems to be in Preoperational but ready for Concrete Operational; she probably fluctuates between the two right now. She had a hard time relating to more than one aspect of a situation at a time, she was more centrated. She had difficulty seeing parts, rather than just the whole as when she crouched herself up to fit the remainder of wall after she had measured it with the height of her body and when she said the remainder of the table did not count when the full length of the ruler would not fit on it.

I was also able to use and observe what I had learned about Piaget and the stages of development all children go through. Some of the characteristics of Preoperational as I understand them are definitely part of where Jamie is right now, and I could see characteristics of what Piaget defines as Concrete Operational with Mary. I've never witnessed this first hand before. I'm glad I had the opportunity to have some of what I have been learning verified right before my eyes with my own children.

NOTES ON MOLLY BREARLEY
Compiled by Joyce Bishop

THE TEACHING OF YOUNG CHILDREN:
Some Applications of Piaget's Learning Theory

R. Bott	E.M. Hitchfield
M.P. Davies	J.E.L. Johnson
M.L. Glynne-Jones	J.R. Tamburrini

Chairman: Molly Brearley
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Schocken Books, New York

In choosing these quotations and notes, I hoped to capture the point of view of the book, and record some of the guidelines which might be useful to me later.

Chapter 2, Science: expectations, conjectures and validations

p. 19
"Young children should find in the schools a nurturing influence for their natural curiosity. It is to be expected that many of their investigations will be transitory and fleeting, for they are seeking merely to answer specific questions. But as they build up understanding of relationships, so they begin to search for more general statements."

p. 25
"Science, it is true, includes a body of knowledge, but in appreciating its full meaning, it is necessary to include the METHODS by which such knowledge is acquired."

p. 25
"The growth of understanding by children in the natural scene around them, arises out of practical problems which the teacher has the responsibility of drawing to the children's attention."

p. 25
"In a classroom providing opportunities for experiment, children will arrive at tentative conclusions and should be encouraged to submit them to the scrutiny of group discussions.... the judgment is not just on the results of experiments, but also on the method. It is the examination of the means by which a statement has been derived that determines whether it is acceptable."

p. 28
"We are concerned not so much that children should arrive at the same results as highly trained scientists as to see they draw conclusions from their own information in a rational way. Children will make statements which they can

put to the test. They will ask questions and can be encouraged to ask questions which are best answered by their own observations and experiments."

p. 31-32

"As the developing child builds up experience, so he has more to bring to the solution of problems. The ability to bring past learning to bear upon new problems depends on making assumptions about similarities in the world. This propensity to look out for regularities is built into the human organism: no mental development is possible where all phenomena are interpreted as unique and discrete. Each new event must in some measure be dealt with in terms of past events. That such a basic need to find regularity exists is confirmed by the satisfaction of children who achieve such discoveries. A regularity that children are continually discovering is that one thing invariably leads to another, and so the notion of causality is born."

p. 33

"Our responsibilities as teachers do not extend just to potential scientists, for we do not know where the interest and enthusiasms that we foster in children will lead them. In fact, all of us need to have a rational view of the world; if we are to make sense of it. The attempt begins in the earliest explorations of childhood: the interest and curiosity are there initially. Our task is to see that they do not atrophy, because it is through them that we can acquire a truly scientific attitude of mind."

Chapter 3 Art: representation and expression

p. 39

"Since children need to explore materials before they can go on to express their representations through them, the provision of a variety of materials for creative expression is essential in the first school. Materials for modelling should include clay and wet sand. Clay is preferable to plasticine as it is more malleable. Bricks, junk material and wood should be available for construction work, covering a range of shapes, sizes and textures. Adequate tools, glues and so on should also be provided.

Materials for drawing and painting should include a range of colors and sizes of paper and a variety of brushes and other implements, such as felt-tipped pens, thick and thin waxed crayons and pencils. Collage materials too should cover a range of textures, colours and patterns.

Children need experience with materials to acquire skill in using various media, but there are other sorts of experiences which are crucial, for they are the experiences which give content to children's expressions."

p. 41

"... they (children) need not only a wide spectrum of experiences, but also a sequence of experiences which relate to each other and which lead to increasing depth of understanding."

p. 41
"there should be a quality of cumulativeness about the experiences we make available to children which leads to depth in understanding as well as to variety of imagery."

p. 41
"From five to eight years, when children are seeking more detail and precision in their increasing desire for realism, the opportunity to inspect the adequacy and appropriateness of their representations and thus to develop more understanding and control is made possible through their expressive work, and is of great importance not just for their artistic development but for their intellectual development generally."

pp. 44-45
"Three stages of development which reflect the growth in understanding of spatial relationships can be seen in children's pictorial space . . .

1) synthetic incapacity
2) intellectual realism
3) visual realism

l) (seen in preschool) imagery appears partial, fragmented, because spatial relationships of proportion, distance orientation and perspective are neglected, and this neglect results in a failure to synthesize imagal elements.

2) (seen in the younger children in first school) the child does not draw or paint what he can actually see, but rather what he knows to be there.

3) (seen at 9 or l0 years) child knows or understands more about relationships of objects to their spatial co-ordinates. Work is based on closer observation."

pp. 50-51
"A work of art has a function in extending human experience. Since its form expresses certain ideas about feelings which cannot be fully grasped separately from their form, it can give new insights to the observer. It can deepen understanding or enlarge it with new facts and new interpretations and can refine feelings. This function has significance for both the development of children's creative potentiality and for their aesthetic development which may be even more important. Not all children can become adult artists, but our concern in education should be for the development of aesthetic appreciation in all children. It has already been suggested that exposure to works of aesthetic

value, to paintings, to sculpture, to pottery, can provide models for an artistic "vocabulary". At the same time they should contribute to a deeper understanding, a refinement of affective life and to the development of aesthetic sensibility.

Chapter 6 Mathematics: ordering, relating, measuring

p. 89

"Mathematics is based on experience: it is the crystalization of relationships into a beautifully regular structure, distilled from our actual contact with the real world. (Z. P. Dienes, **BUILDING UP MATHEMATICS**, Hutchinson, 1968.)"

p. 94-95

A problem with cardinal and ordinal numbers: Gather a group of sticks (or pencils) of different lengths. Have the child arrange them in order from shortest to longest. Offer some more sticks to fit into the pattern. Place a doll on one stick (step) and ask how many the doll has climbed and how many to go. Disarrange the whole series.

Place a doll on the first step and repeat the question.

Preoperational children will identify longest and shortest, but not in between.

At the next stage, children can arrange original series, but can't handle the second group.

Only the oldest children can do all the tasks.

Brearley quotes Piaget "A cardinal number is a class whose elements are conceived as "units" that are equivalent, and yet distinct in that they can be seriated, and therefore ordered. Conversely, each ordinal number is a series whose terms, thought following one another according to the relations of order that determine their respective positions, are also units that are equivalent and can therefore be grouped as a class."

p. 95

". . . the stage at which sensory-motor actions predominate ends at approximately two years of age, sensory-motor activity itself does not cease. The explorations of materials continues throughout the first school and beyond, and it is from these explorations that concepts are built.":

p. 96

"The need to provide throughout first school continuing opportunities to manipulate materials."

". . . accurate generalizations are more likely to be made as a result of experiences with a wide variety of materials and objects."

p. 97
"A teacher has a dual responsibility in the development of mathematical concepts, first in creating the basic environment within which the learning can take place, and second by intervening in children's learning when appropriate, to help them focus on the relevant mathematical elements. Throughout this book the role of language in clarifying, redefining and extending children's ideas is emphasized, and it is crucial in helping children to focus their thoughts on mathematical relationships."

p. 98
"At first school stage, precise language is particularly important in bringing about the move from perceptual to conceptual thought, for it is by language that abstracting and generalizing activity is brought into conscious awareness by a child and that the "crystalization of relationships" is made possible."

p. 99
During first school, any activities which involve classification and seriation contribute towards a child's concept of number.

p. 100
"As children reach conservation of number they show this in many and various ways. It is shown, for example, when a child "counts on" at an appropriate time.

"Thirty-five bottles of milk were delivered to a class when forty-one were needed. When extra bottles were brought, the seven-year-old boy who had done the original counting said "We need six more", and proceeded to count "thirty-six, thirty-seven,. . ." as the bottles were added."

p. 101
"The achievement of conservation of number means that children can move on to the further stage of conceptualization of relationships between numbers. Such relationships include number sequence, number combinations, prime and non-prime numbers, place value and base, and relationships between numbers which produce number "patterns", for example, odd and even numbers and tables.

It is important to emphasize that the ability to deal effectively with these numerical relationships is on the development of mental structures within a child and not on the build-up of rote knowledge."

Some good apparatus: abacus, hundred board *p. 103*

"Once children are able to recognize and group objects according to shape, they should go on to perceive more complex relationships, for example, symmetry and tessellation (the discovery of which regular figures can be fitted together exactly, for example, octagons).

Measurement ideas:

Compare how far children can blow a seed, balloon, throw a ball.
Use a wide variety of measuring tools.
Use experiences with large units, travel, months, years, weight.
Measure clay, wet sand, cooking ingredients.

Good apparatus: spring balance, pint, quart, gallon container, bathroom scales

Make a book of pictures of things older than me.
Make a pictorial or verbal record of events. These help develop concepts of temporal continuity.
Use calendars and timing devices.
Use stop watch, alarm clocks, egg timers, and cooking timers, candle and water clocks.

p. III

Values of recording

l) a means enabling them to organize or reorganize what they already know
2) enables children to order knowledge so that comparisons and relationships can be discovered
3) recording may be used by a child to gain further knowledge, or may itself lead to the discovery of new facts.

p. 112

"Children must themselves understand the purpose of any recording they undertake."

p. 113

Take advantage of opportunities to estimate. "Examining the result against the original estimate encourages the perceptual and conceptual refining discussed earlier."

p. ll4

"The main function . . . is to provide children with the environment and help which will enable them to begin to bring about a match between the personal psychological learning structures which they have been developing since birth, and the logical structures of mathematical knowledge."

QUOTE

The following are the words of **Pablo Casals**:

"Each second we live is a new and unique moment of the universe, a moment that never was before and never will be again. And what do we teach our children in school? We teach them that two and two makes four and that Paris is the capital of France. When will we also say to each of them what they are? We should say to each of them: Do you know what you are? You are a marvel. You are unique. In all of the world there is no other child exactly like you. In the millions of years that have passed, there has never been a child like you. And look at your body - what a wonder it is! Your legs, your arms, your cunning fingers, the way you move! You may become a Shakespeare, a Michelangelo, a Beethoven. You have a capacity for anything. Yes, you are a marvel. And when you grow up, can you then harm another who is, like you, a marvel? You must cherish one another. You must work - we must work - to make this world worthy of its children."

TEACHER AND CHILD
Haim G. Ginnot

Reprinted from **TEACHER AND CHILD**, The Macmillan Company New York, New York 1972

I have come to a frightening conclusion. I am the decisive element in the classroom. It is my personal approach that creates the climate. It is my daily mood that makes the weather. As a teacher, I possess a tremendous power to make a child's life miserable or joyous. I can be a tool of torture or an instrument of inspiration. I can humiliate or humor; hurt or heal. In all situations, it is my response that decides whether a crisis will be escalated or de-escalated and a child be humanized or de-humanized.

LURKING

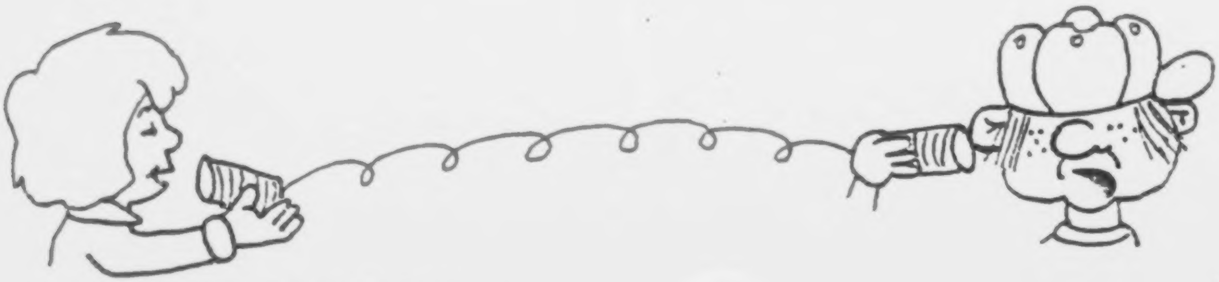
On computer bulletin boards and information exchanges, "lurking" means reading messages without replying.

Teaching is a very lonely profession. One talks, in the odd moments available, to one's next door colleague, and to the school secretary, but there is rarely the time and energy and opportunity for thoughtful, professional, long-term discussions of educational ideas, alternatives, philosophies.

And if there is time -- rare -- one's contact is limited by the boundaries that are all around us -- school boundaries, school system boundaries, town boundaries, state boundaries.

Information such as CompuServe and The Source enable rich exchanges of ideas in one's off-time (often late at night) among teachers all across the nation. The conversations, often between teachers who have never met and who may never meet in person, are among the most caring, informed, and thoughtful one might experience. I tune in nightly to five educational forums on CompuServe -- EDU-11, EDU-12, HOM-137, EDU-18 and an invitational forum -- and know of two others I would dip into if time were available. Drop in sez I.

Following are excerpts from some past discussions on CompuServe. -- TO'B



Online Today OLT-653

CALIF. PLAN TO DECIDE THE FUTURE OF COMPUTERS IN THE CLASSROOMS

(MARCH 27)

Oakland, Calif. -- California has embarked on a short-term plan to decide the long-term future of computers in education.

The California Model School Project is designed to determine how to effectively use technology in the school curriculum and management, statewide director Dr. Dorothy Shipps told educational software publishers yesterday at the semi-annual Software Publishers Association conference here

"It is important to convince policy makers that education can be improved with computers," she said. The project stands to change the face of education in California, because more than 100,000 new teachers will be hired in the next five years -- a 40 percent turnover in educational staffing.

"We can make a tremendous impact," she said. "We know our needs are changing. We need to know where to go to change education for the better."

Four model schools will be selected throughout the state and will cover grades K-12. The program will be phased in over a period of four years -- each year a new range of grade levels will be added. Every curriculum category will be affected.

"This is pretty radical. Usually computers are used for reading skills at a grade level. This is much more ambitious," Dr. Shipps said.

The program is designed to make recommendations that will affect educational policy, she stressed, and is not being conducted for pure research.

"Questions will be posed in terms of realistic policy options. Do-able projects with do-able software and do-able hardware," she said and not something farther down the road.

Businesses and government will join educators in this project, she said. The state is paying $500,000 per site each year. Local governments are required to match that figure by 10 percent. Businesses are being asked to provide technical assistance and make in-kind donations of equipment and software.

Educators will file reports every year and present final recommendations after the fifth year.

--Daniel Janal

Online today OLT-324

BILL FURTHERS COMPUTER EDUCATION

(MARCH 30)

A group of Senate Democrats joined this week in introducing a bill that would authorize $150 million to assist states and local school districts in developing computer education programs.

Joining in introducing the measure were some of the Senate's most forward-looking members -- Sen. Frank Lautenberg (D-N.J.), Sen. Timothy Wirth (D-Colo.), Sen Edward M. Kennedy (D-Mass.), and Sen. Daniel P. Moynihan (D-N.Y.).

"Computers are fast becoming a fact of everyday life. We have to give our children the tools to meet the challenges of the information age." said Lautenberg, the primary sponsor of the bill.

The Computer Education and Assistance Act of 1987 calls for $150 million in the first year and "such sums as are necessary" in each of the next three years.

The money would be available for the purchase of hardware and software and for teacher training. The funds would be provided on 75 percent federal, 25 percent local matching basis.

Lautenberg cited statistics showing that most schools have at least one computer available to students, but that on the average the nation's schools have only about one computer for every 50 students.

Wirth, who chaired the House telecommunications subcommittee before being elected to the Senate last year, said the bill has implications that go far beyond the nation's school systems.

"This bill is designed with three essential goals in mind -- improving America's competitiveness at home and abroad, ensuring that the next generation of graduates is adequately prepared to meet the challenges of tomorrow's technologically-advanced workplace, and ensuring equal education opportunity by targeting funds at low-income and rural school districts which have traditionally been unable to afford the hardware and software their students need." Wirth said.

"There is no question," Wirth added, "that the sheer number of computers currently in use in school districts has increased tremendously." He added, however, that in many instances the systems have not been integrated properly into the curriculum.

Moynihan, meanwhile, said computer education will become even more important in future years -- "Fifteen years ago the birth rate in America fell below the level necessary to maintain the population. The information age will find us with more jobs and fewer people. We need to prepare every child for the future," he said.

Joining in endorsing the bill were representatives of some of the nation's leading high-tech lobby groups -- including the Association of Data Processing Service Organizations (ADAPSO), the Software Publishers Association and the Computer and Business Equipment Manufacturers Association (CBEMA).

"America high technology depends not only on well-educated scientists and engineers, but also on a user public that understands computers potential," said CBEMA President Vico Henriques.

"Elementary and secondary students must learn to use information technology as easily and quickly as they use books and pencils," Henriques said.

"Too many school districts have invested in computers without budgeting enough for software to make the machines truly useful, others have not recognized the need to invest in teacher training to ensure that the educators can use technology effectively in their teaching," added George DeBakey, executive director of ADAPSO.

"We feel Sen. Lautenberg's legislation will help students improve computer and instructional skills and ultimately better prepare them for their chosen careers," he added.

--J. S. Orr

CUTTINGS

Teachers who come to the Teacher's Center turn in a weekly diary. In it they've written about what they've been reading, activities they've tried with kids and their observations of children's thinking along with general comments they wish to make about what they've been thinking, reading, doing and observing.

Many of these diaries contain material that is too good to remain buried in someone's file; it begs to be shared. So, in "Cuttings" we've simply lifted parts of individual diaries and reprinted them. Read them, think about them,. share them and help them grow.

CUTTINGS

Debra Bozzardi

I used bead strings in working with two sixth grade students. The first student is an extremely bright girl who is at the top of the class. I began by asking her to find 32 on the bead string. I assumed that she would hit upon grouping the beads by color into tens right away, but she counted out the beads one by one from the left end of the string. I asked her to subtract 11, and she began to count from the left end of the string up to eleven. She then found the answer by counting on to 32, and then counting the beads between 11 and 32. (Prior to beginning work, I had told her that she could not work the problems by adding or subtracting in her head; she had to use the bead string.) I asked her to find another method than the one she had started with to find 35. She responded by counting by fives. She did not hit upon grouping by color until after we worked multiplication problems. I asked her to find 7 X 3 and she marked off three groups of seven, again arriving at her answer by counting off. I asked her to find 18 divided by 3, and she found the answer by dividing the beads she had counted out into three equal groups. I asked her if she could find another way of finding 28 and it was then that she hit upon grouping by color.

I began to work with another student and found his methods to be quite interesting. I asked him to find 72 and he counted out the quantity bead by bead, as the first student had, from the left end of the string. I asked him to subtract 42. He went back to the left end of the bead string and counted forward to 42. He told me the answer was thirty. I asked him to show me how he had gotten his answer. He said he did not know if what he did was right, but he looked at the group of beads left between 42 and 72. He noticed that there were 8 pink beads on the one side and 2 blue beads on the other side, with two groups of ten beads in between (one pink, and one blue). So, he added 10 + 10 + 8 + 2 in his head to get thirty. I told him I thought his method was very interesting and creative, and he beamed! I asked him to find 32 divided by 8, and he translated the problem into "how many 8's can I get out of this group of 32 beads?" He counted by fours, and grouped the fours into eights to arrive at his answer. I found his problem solving approach to be extremely interesting. This is a student who is always trying very hard to please, and who thrives on hard work.

CUTTINGS

Catherine Fickert

I am wondering if we've gotten the horse before the cart with kids. Maybe if children were allowed and encouraged to learn through manipulation, they would let us know when they were ready to begin using written numbers. Would this just be a natural part of their development, without us having to set a time to introduce it? This is something I would really like to know or pursue.

CUTTINGS

Sue Middleton

The principle "The accurate use of words does not guarantee understanding." might also be a useful statement for my desk top. How often do we judge intelligence by the correct, nice, neat responses instead of insight. Also the way we assume that to be correct their response will be a "Paler version" of our own. What arrogance!

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CHILDREN AND MATHEMATICS, A WINNING COMBINATION IN THE LAND OF THE GIANT PANDA

by
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"thank you"

Introduction

The opportunity for me to go to the People's Republic of China was one in a million. Because of my visit, I have new insights into life throughout the world and to the teaching of children. This study is a brief compilation of what I saw in the brief time I visited. There was so much to see and to do. The friendships born out of this visit to PRC will remain with me throughout my life.

As a result of my observations, I see that if the United States is to continue to produce world leaders, we must take a close, hard look at our educational system which is lacking in so many areas of study, especially Mathematics. The Chinese have looked at their system and have made the decision that they must do more if their children are to grow up ready to meet the technological challenges of the 21st Century.

Educational institutions in the United States, from my perspective, have been slow to accept change. Teachers entering the field have had few more courses to study than I did twenty-eight years ago. The world has changed much in that time span. I pray that we as a people do not have to experience some major catastrophe before we realize that our educational system needs overhauling. We, as educators, cannot be content to teach as it has always been taught. By so doing, we relegate our students to second class world citizens.

This independent research project has opened my eyes to what I already knew - that we are falling behind in the race for science, mathematical and technological superiority in the world.

"Mathematics Is Basic To The Study Of All Other Subjects"

"Smart Students Work Hard And Learn More"

"Study, Study, Study Some More"

"Work Diligently For The Future Of The Motherland"

"Unite And Make Progress"

The slogans above were posters written in Chinese characters and observed by children and visitors in mathematics classrooms in the People's Republic of China.

General Observations and Impressions[1]

China's population is now more than 1,100,000,000 - nearly five times that of the United States.

There are nearly as many students in Chinese primary and secondary schools as there are people in the United States.

There exists a rigorous campaign to limit family size to one child.

The priorities in China's development are the Four Modernizations: Industry, Science and Technology, Agriculture, and National Defense.

Mathematics holds a long and important tradition in Chinese history.

China has a National Teacher's Day, honoring all school teachers.

Parents, teachers, administrators and peers have high expectations of students in school.

There is a unified mathematics curriculum, called the New Unified Series, used throughout all of China.

In some primary schools, teachers stay with the same class for 2-4 years.

In moral education classes, students are taught how to behave.

Chinese students attend school about 240 days per year, 6 days a week for 40 weeks.

All students take mathematics each year they are in school.

The mathematics curriculum is intensive.

Mathematics is often taught during the first two periods of the day along with Chinese language.

Teachers frequently have only two periods of instruction (out of six) each day.

Students stand and greet their teachers at the beginning of the class, and stand and say goodbye at the end.

Class sizes range from 40-60 students.

Eye exercises are done by all students each day (designed to prevent myopia).

The teaching of geometry and algebra begins in the primary school.

Entrance examinations are required of students to enter grade 7 and grade 10 of the key middle schools and all universities.

Homework is required which involves a small number of problems, significant problem solving, and is checked regularly.

Note-taking during class instruction is not encouraged - students are expected to observe the teacher and answer questions.

There is a growing use of microcomputers in Chinese education.

Mental arithmetic and problem solving are an important part of the primary school curriculum.

A Chinese student who has finished compulsory education (9 years) has already studied most of what we consider high school geometry and algebra.

There is still wide-spread use of the Chinese abacus (Suanpan) by merchants/business people.

Background

The China visit was sponsored by the Illinois Council of Teachers of Mathematics (ICTM). The delegation was formed following an invitation from the Chinese Mathematical Society, whose members come from the ranks of mathematicians and experienced teachers from all school levels.

Arrangements from the United States with the China International Conference Center for Science and Technology (CICCST) in Beijing were handled by the US - China People's Friendship Association (USCPFA) in Washington, D.C. All arrangements in China were handled by the China Association For Science and Technology (CAST) in Beijing and its branches in the cities and provinces visited by the delegation. International travel was handled by B and A Travel in Carbondale, Illinois which made a contribution of $2000 to ICTM's Scholarship Fund.

The delegation (individual names in the introduction) included teachers, administrators and Educational Service Center personnel from all levels (elementary through university) throughout Illinois. In total, members of the delegation were experienced with virtually all aspects of mathematics teaching. The group visited a total of fourteen schools in eight cities (Beijing, Xian, Nanjing, Wuxi, Hangzhou, Shanghai, Guilin, and Guangzhou). It also visited or had discussions with staff in other places such as a bookstore, a Children's Palace, People's Publishing House, a math teacher's home, and school policy-making groups.

At the top of the delegation's priorities were visits to classrooms and discussions with teachers and students. Not only was there a healthy change of ideas and practices centering on the professional life of teachers, but there was also an exchange of materials. Various American publishers/manufacturers (see acknowledgements) donated a variety of books, pamphlets, monographs, teaching aids, and calculators which were given to Chinese counterparts who, in turn, presented a variety of materials to our delegation. The delegation was also invited to four magnificent banquets hosted by outstanding Chinese scholars and leading members of CAST.

The delegation had periodic, informal discussions of what we were observing in classrooms during the March 1-21, 1987 visit and a "summing up" session in Hong Kong. The delegation reconvened six weeks later in Decatur, Illinois to discuss the visit and prepare this report. Since change is the one thing that seems to remain constant in China and because China is undergoing such rapid change, the delegation wants its observations added to those of other groups, such as the 1977 NCTM delegation (Madell & Becker, 1979; Swetz, 1979), the 1980 and 1984 delegations of the US - China People's Friendship Association (Ware & Becker, 1983; Becker, 1984) and the People-to-People delegation (Meserve, Lichtenberg & Leitzel, 1984; Steen [Ed.], 1984).

Ryhthm of Life

It is natural when visiting a foreign country to observe the people and, as much as possible, what is "going on." Those who visit China are quickly immersed in the movement of people. As we travelled by air, train, bus, cars, boat, and foot we observed people moving about by foot, bicycles, oxen- and horse-drawn wagons, cars, trucks, buses, motorcycles, and walking tractors, all on the same thoroughfares! It was common for us to feel impending disaster in this huge movement, but we saw only two accidents. For vehicles, we concluded that the two most used parts were the horn (bells on bicycles) and gas pedal. Small two-wheel motor driven "walking tractors" were seen everywhere in China - in and out of the cities. They pull trailers and just about anything.

Bicycles

Bicycles are everywhere - millions of them - in both urban and rural settings. We saw parking lots for bicycles everywhere - park it, lock it, and leave it. Bicycles are simple, but sturdily built one-speeds. Frequently, a bicycle has two or three riders - the driver, a child in a small seat, or a spouse or friend on the back. But bicycles are also great freight carriers - large bundles of produce on either side of the back wheel and piled high above it. Three wheelers might be carrying a sofa (with or without a person on it), beds, refrigerators, etc. We could not help admiring the pedaler's physical stamina.

Physical Exercise

Chinese of all ages exercise regularly. China "comes to life" early, by 5:00 a.m. Walk anywhere in a city and you see people jogging, doing Tai Chi, calisthenics, or other exercise forms, either individually or in groups. In the rural areas one sees farmers walking behind water buffalos plowing rice or wheat patties or digging small irrigation ditches. If people rise early, so they also retire early. Streets are bare by 8 p.m. except, perhaps, when movies let out by 9-10 p.m. and even then people quickly go home.

Friendliness

Friendly people are encountered from the moment one arrives in China. Smile and total strangers smile back. We were frequently approached on streets by people who wanted to practice their English. No sooner does a conversation begin than one finds a crowd gathered to observe the goings-on. Or if we were in a shop or department store making a purchase, a helpful person approached to assist, followed by a whole audience of naturally curious people. Not being embarrassed in the least, they would frequently move very close (touching or crowding) to watch and listen to the transaction. Commonly we were referred to as foreign guests.

Open Doors and Windows

Even when it is cold, doors and windows are open. It was chilly in several cities we visited and after several days we learned to dress accordingly - by layered clothing as is common among Chinese. Aside from hotels and regardless of the nature of our activity (professional or otherwise), most buildings we were in had no heating. But life went on in a natural way. Just as there is no central heating, so there is no central air-conditioning, except in hotels for tourists.

Food

We were treated to scrumptious meals. We feasted on a multitude of meat, fish, and vegetable dishes, steamed buns, rice, bean curd, fruit, mushrooms, lotus root, nuts, and a host of other really fine foods and desserts. Of course, the Chinese do not eat like this except on special occasions and even then they only take a little of each dish, a practice which many of us eventually picked up. The Chinese practice is to have a long lunch hour which permits a rest between morning and afternoon activity. We used this time to make other visits to such places as a bookstore, handicrafts factory, site of historical/cultural interest, or just to start out early to a professional visit.

Children and Senior Citizens

It is obvious, even to the casual observer, that the Chinese reserve special consideration for both the very young and the old. Senior citizens are accorded special respect and deference. Grandparents, along with parents, play an important role in bringing up children. It is common to see grandparents with children at the markets in the morning, or meeting children after school to escort them home. While parents are at work, grandparents often care for the children. The Chinese have an extensive system of child care centers, nursery schools, and kindergartens (for children ages 3-5) which are connected to factories, schools, universities, and various other institutions. The general attitude is to provide warm and loving care for children who are openly regarded as China's future.

Education

> Of course I never had a chance to go to school, so I was illiterate. The traditional rulers liked to keep us illiterate so that we would not demand our rights and make trouble for them. Now I have studied in literacy classes and can understand some articles in the newspaper. But still it is hard to learn when you are old. But all my grandchildren are students now. And, just imagine -- one of my grandsons has gone to study at the university.
>
> [2]
>
> - An old woman of Huadong Commune

This is the old and the new in education, as described by an old woman in rural China. When the Chinese want to explain their ideas about education, they always contrast the present with the past. The past does not mean simply earlier in this century, for Chinese civilization is over two thousand years old. Throughout Chinese history, education has played a central role, as it does today. Here the similarities end, for in 1949, Liberation turned the old Chinese education system on its head.[3]

Education in traditional China was for the few and the rich; today it is for the many and especially the poor. In the old society most young people had to work; they had no time for school, and no money to pay their expenses. Only the sons of officials, landlords, and merchants could receive an education. The results were predictable. In 1949 about

80 percent of the Chinese people were illiterate, and these were the poor. Now priorities have been reversed. A lengthy literacy campaign has been successful, and only those people too old to learn cannot read Chinese newspapers. In place of a system that favored the rich, the Chinese have substituted one that gives extra support and encouragement to students from poor peasant and worker families.[4]

Students under the old system were trained to be scholars, and this term had a very limited meaning. A scholar knew the history of the past; he was intimately familiar with Chinese literature and poetry; he often painted romantic landscapes; he could become a government bureaucrat. Most important, he didn't work with his hands, a fact emphasized by his long fingernails. In China today, intellectuals are taught to be completely unlike the scholar of the past. Practical skills are taught, skills that will help China develop economically and socially. Intellectuals do not merely sit in libraries. Long fingernails are not possible, for today's educated man or woman works in factories or on farms. Like some common sense-oriented Americans, Mao Tse-tung believes that people cannot learn only from books, and the Chinese apply this theory in their educational system. A student learns theory, but also how to apply it. The student thus works with his hands, and learns to respect others who do, too.[5]

In Old China those with education had power, as well as money. They used their power to rule China for their own profit. The purpose of the new education is just the opposite: the Chinese want to train leaders that will serve the interests of all the people, not just a few.[6]

The Cultural Revolution, beginning in a university, brought the educational system to a complete standstill. Schools were closed in 1966, and some universities have not yet reopened. Throughout the Cultural Revolution there has been agreement about the aims of education. These are to train people with skills useful in solving China's economic and social problems, to motivate students to serve the people rather than to pursue their self-interest, and to expand educational opportunities for young people from poor peasant and working-class families.[7]

The debates in the Cultural Revolution were thus about the methods of achieving these goals, not about the goals themselves. The Red Guards argued that school administrators were creating a new educated elite trained in abstract theory, not in practical skills. They felt that students were not doing enough practical labor, and consequently were too far removed from the people they were supposed to serve. Furthermore, and perhaps most important, the Red Guards believed that the educational system was producing students with "bourgeois" values. By this they meant that students were not interested in serving the needs of China, but in selfishly seeking material comfort and personal prestige.[8]

In researching the educational system in China, I found that the Chinese school system has skillfully meshed facets of each type of "old" ways of doing it. There is a new openness in learning. People are encouraged to express their ideas - to an extent. China has opened its doors to the rest of the world and by inviting educators from other countries to theirs, they allow themselves and their people to get a few brief glimpses of "what everyone else is doing in education."

In a speech delivered to outstanding teachers last September, Li Peng (State Education Commission) made several points regarding the development of elementary education in cities and counties. One, in step with the compulsory education law, effective July 1, 1986, local area schools should be established as conditions allow, but they should avoid competing for resources. Two, schools should avoid setting goals on student entrance rates into the next level of schooling. Three, vocational and technical training should be emphasized, as such skills are still weak in rural areas. Last, regarding the safety of school buildings, Li stated, "Party and government leaders at all levels should personally inspect rural schools when they go to the countryside. They should take action on the spot if they find any problems. Money appropriated by the state or the localities or raised by the general public should be used first of all in resolving the question of unsafe school buildings."[9]

The school buildings that I visited during my visit to China were stark and drab. They were built at a time when the Soviet Union was influential in Chinese politics. One rural school building I visited was relatively new but yet, it resembled the architecture of the older buildings. The Chinese proved to me that it is not the physical plant that makes the difference in the educating of children, but the educators and the motivational factors instilled in the children.

Themes in Chinese Society and Education[10]

Just as it is common to observe what we have loosely termed the rhythm of life, so it is natural to look for general themes which pervade Chinese society and education. During and immediately following the Cultural Revolution, Socialist-Egalitarianism was the principal Maoist value in education. The main objective was to ward off elitism. One manifestation of this was the practice of having teachers, professor, students and other professional workers engaging in physical labor by working in industrial plants, school and university run factories or on farms. But there is much less obvious emphasis on this now even though a work-study program remains an important policy in Chinese education.

Serve the people is another major theme. Pride is instilled in primary and middle (secondary) school students in helping others and individual preferences are not expressed. Orienting education towards social utility and an attitude of everybody being an equal contributor to the national effort are still characteristics of Chinese society. What we might term the collective is still a striking characteristic of Chinese life. A student is considered part of a group **and people**, in general, have responsibility for others. When someone has difficulty or gets "out of line," it is the responsibility of the group to help that person out - the welfare of the group depends on all members of the group. This omnipresent pressure to conform can be seen in group activities in schools. However, there have been some changes in this with the establishment of key schools, mathematics contests and admission tests for middle schools and universities.

During the period of the 1960's - 70's, Self Reliance was a major theme in society. For example, national development free from foreign influence was very common. However, one sees a large divergence from this policy now with China reaching out and adopting an open-door policy in which foreign investment, joint ventures, and expertise are evident in all parts of China. One sees this in education as well as other aspects of Chinese national life.

An intense Patriotism is instilled in children from pre-school and kindergarten onwards through the middle schools. This was a major theme of Chinese life in 1949 and is unchanged today. An example of this is the revolutionary music played over the public address system while students engage in eye exercises and physical culture every morning.

Many changes which have recently occurred in China are due to wide ranging changes in national policy. For example, great emphasis is placed on Science and Technology in China. Following the Cultural Revolution in 1978, the government convened a National Science Conference in Beijing to lay out national policy for scientific development. There followed, a month later, a National Work Conference on Education and by Fall, 1978, a national group of mathematics educators met in Beijing to recommend details and set in motion large scale curriculum development in mathematics. Within a year and a half a New Unified Series of mathematics textbooks for primary and middle schools were being used in all schools throughout China. This new curriculum went through a subsequent revision and is presently under major revision again.

Reference was made to the Four Modernizations earlier. Based on background reading before going to China and observations during our visit, we are tempted to label Education as a fifth modernization. Contrary to the emphasis on political attitudes (or "redness" as it is called) during the Cultural Revolution, the emphasis is now clearly on academics or "expertness." These two concepts have competed in China since Liberation in 1949 and have resulted in periods of turmoil. How well the two concepts continue to harmonize in practice is one of the most interesting phenomena to watch in China during the late 80's and 90's. A level of harmony will in all probability lead towards continued progress in China's efforts toward modernization.

Structure of Education

Many students, especially in urban areas, begin their formal education as early as age 3 in pre-schools and kindergartens. Primary education is being restructured to include the following types of schools: countryside (simple) and countryside (adult) - both designed specifically to eliminate illiteracy; "regular" primary (5 years) in rural areas; primary (6 years) in urban areas. If the resources available to the government are scarce, as they are, then they are also distributed unevenly throughout China's vast land mass. Thus with the new structure of primary education, the Chinese seek to develop education as equitably as possible for large masses of people ranging from illiterate in the rural areas (with 85% of the population) to the more fortunate groups with more opportunity for education in urban centers (15% of the population). This also is the objective in implementing the new national policy of compulsory education for grades 1-9. Compulsory education for all Chinese youth for grades 10-12 in the rural areas is, perhaps, the next step in educational progress.

Grades 7-9 make up the junior middle school. Students' alternatives after junior middle are entrance to senior middle school (grades 10-12), a technical/agricultural school or being assigned to work in factories or on farms. We were told that in rural areas, 70% of the students do not continue their education beyond junior middle school; but in the urban areas, 100% continue in school, with 40% going to senior academic schools and 60% to technical schools. Upon completion of grade 12, a student may take the university entrance examination on which decisions about further education are based. In 1984, 26% of 1,640,000 applicants were admitted to university study.

Perhaps we should insert a note here regarding the courses termed "Politics" in Chinese schools. We did not have sufficient time to probe this aspect of China's educational system. But like our own society, China's is informed by a system of values. These values play a large role in determining where and how social resources are allocated. In China's case, these values are manifested in an ideology based on the ideas of Marx, Engels, Lenin, and Mao. We presume that courses in politics taught in the schools deal with this ideology and its implications.

As part of the drive to recover from the crippling effect of the Cultural Revolution and to achieve modernization, some primary and middle schools as well as universities/institutes were designated "key" institutions. Most of these are located in urban areas. In short, these schools are university prep schools designed to serve the education of talented students. They receive a larger allocation of resources and are staffed by master teachers. Admission is based on performance on rigorous examinations and about 10% of students are accepted. The curriculum offers comprehensive study with special emphasis on Mathematics, Chinese Language, the Sciences, English and Politics.

Alternatives to attending an academic senior middle school are the technical/vocational/agricultural schools. These schools emphasize combining theory with practice with about 60% of time spent on academic study and 40% on practical work experience. We visited one such school in a rural area near Guangzhou and, even here, found the academic level to be high. We also visited ordinary primary middle schools and had the same reaction.

Just as primary and middle school has been restructured from 10 (5, 5) to 12 years (6, 6) following the Cultural Revolution, so university study has been lengthened from 3 to 4 years. Bachelors degrees are now offered as are masters degrees. Doctoral programs have been re-instituted very recently.

By action taken by the Sixth National People's Congress, September 10 each year is designated National Teacher's Day. The first one was celebrated in 1985. The purpose of the celebration is to raise the social and political status of teachers in order to make teaching one of the most respected and admired professions in society and to create a social atmosphere of respect for teachers, knowledge, and talent. On September 10, 1986 a huge assembly was held in Beijing to commend 1000 educators, 100 educational institutions and 100 counties in primary education. Top government officials awarded medals and bonuses for meritorious service and the State Education Commission organized lecture tours for outstanding teachers. Top officials of the Commission also attended meetings of teachers, commemorative postal stamps were issued and a ¥ 1 million fund is being established for use in rewarding outstanding teachers. (Note: $1 = ¥ 3.70)

Welcome to the Pre-School[11]

Out in the courtyard in the warm morning sun a row of little Chinese children are hopping like rabbits. They are only three, they have cardboard ears on, and little baskets in their hands. They follow the teacher's instructions to hop one by one up to a flannelgraph, where they pick off into the baskets as many beetroot (of cardboard) as they want, and then hop, hop back again, up onto the bench and then into line and it is the next one's turn. The teacher smiles proudly. The children think it is fun. It is an enchanting sight for us Americans.

Inside the large stone house, children's voices echo. Cool air meets us as we go in and a distinctive smell, something between tar and household soap, crosses our noses. The people here smell of it, too, not deodorant or perfume but just clean -- it must be the soap and disinfectants which are different.

We are inside our first pre-school in China. It is exciting. Hordes of happy children rush past us on the stairs. They shout NI HAO ANTI, hello aunts and uncles, wave and laugh. So we are welcome! The teachers we meet smile and greet us. They also seem to think that our visit is exciting!

The children have classrooms. We go in to the 5-year-olds, who are sitting in rows roughly like our children in the first years at school. At the front of the room there are a flannelgraph and a blackboard, along the walls cupboards for materials. On the top shelf there are rows of pink rubber animals and dolls. There are various games and building sets and, at the bottom, masses of balls. The materials are worn and well used. Everything is either stacked in proper piles or in rows. Next to the classroom there is a washroom with rows of basins and taps low down, and WCs in doorless cubicles, too. To us the standard looks primitive, but it is clean and pleasant. All the children's towels hang on hooks. In another room the whole floor area is taken up by beds, which have high bars at the ends, and on each bed lay a pillow and a colorful folded blanket. The dormitory is pleasant and light, and has two windows with curtains that can be drawn. This one is for a five-year-old group, so there are 30-35 children.

The pre-schools are often housed in buildings used earlier for other purposes. The floor is often cold cement, but sometimes there is a wooden floor. The heating has been switched off and instead all the windows are open so that what warmth there is outside can come in. The houses are heated in winter with coal and briquettes. Americans are not used to the difference between coldness inside and warmth outside and it is slightly unpleasant with the constant draught. By contrast the Chinese are dressed to feel good. All have at least four layers of clothes: long underpants and vests, blouse, jumper and jacket both indoors and outdoors.

The pre-schools are not overloaded with materials, pictures, mobiles, etc, The walls are painted white, or else white cardboard has been stretched to cover the walls. On the white background there are few pictures and other items, which therefore stand out all the more clearly. In a big dormitory there are, for instance, only three clear, colorful pictures. There is one of a child making its bed, another picture shows a child mopping the floor, and in the third a child is watering the flowers outdoors with a watering-can. The pictures thus confirm what is desirable behavior. They also communicate joy and pride.

A common theme on the walls is a sparkling painting representing China's various minority peoples. They are dressed in their typical costumes, and light up and shine with joy and community spirit. Like the songs and dances, these pictures are one element in getting China's people to feel that they are one people.[12]

At nearly all pre-schools there is also on the walls a picture of a beautiful tree with cherry blossom, or a big piece of squared paper with pink flowers in rows. What is this? Well, it charts an evaluation of how well the children live up to the four beautifying ideals; in other words, how well they fulfil the pre-school's demands for

-- beauty of the mind
   This is usually shown in the form of a picture of the hero, Lei Feng, who represents an ideal for the children; he was the one who sacrificed himself for others without thinking of himself.
-- beauty of language
-- beauty of behavior [13]
-- beauty of the environment.

Grouping[14]

Children in pre-schools in China are grouped by age, and the numbers of children increase with the child's age:

from 3 to 4: 20-25 children
from 4 to 5: 25-30 children
from 5 to 6: 30-35 children.

No attempt is made to give the children the chance to be with the same classmates throughout the pre-school years; new groups are formed each year. In each group there is a teacher and a nursery helper. At several of the pre-schools we visited the nursery helper works all day in the children's group while the teacher alternates with another teacher. The teacher thus has planning and various meetings for half the day and teaching and work in the children's group for the other half of the day. In this way the teacher can always come to the lessons well-prepared.

The Time-table[15]

The day in the pre-school is carefully time-tabled and even the smallest children, aged 3, have lessons. A normal day in a day nursery begins at 7:30 a.m. and lasts until 6 p.m.

At 7:30 Mummy and/or Daddy, or some other relative, delivers the child. The child is received.

Morning tasks: the children water flowers, feed the fish or look after the pre-school's own animals. The children clean and make the place look tidy and otherwise are free to choose what they play with or look at in books. Learning to take responsibility for personal hygiene and the immediate environment is important in the pre-school. To be careful with and protect anything living, plants and animals, is part of upbringing.

Next comes morning gymnastics outdoors:

8:30 -- 5-year-olds
8:45 -- 4-year-olds
9:00 -- 3-year-olds.

The teacher directs the children's physical activity outdoors. They line up in rows chalked out on the courtyard. The teacher demonstrates the movements and gives instructions. Morning gymnastics is adjusted by age so that the oldest begin first and remain active longest. These children, the 5-6-year-olds, are expected to be very disciplined. They move simultaneously and in straight lines. The smaller children's exercises are more like play: they are allowed to run round each other, without keeping exact distances, etc. Equipment for morning gymnastics may be dumbbells, sticks or flags.

Morning gymnastics forms one part of preventive health care. As it is cold indoors, it is important for the children to get steam up before they sit down for their lessons. In the winter it is also important to be outdoors and toughen the body against the cold. This is both part of physical training and an exercise in discipline.

In the morning, while the children are alert, there are lessons conducted by the teacher.

3-4-year olds have 15 minutes
4-5-year-olds have 2 x 20-25 minutes
5-6-year-olds have 3 x 30 minutes.

The larger children have short breaks between lessons. Then they go out and play a game together, after which they go in and continue with a different subject. The time-table includes music, language, mathematics, drawing, physical training, creative play, general education (roughly what we would call social studies). The teaching is adjusted to the age of the children, and this is strongly emphasized in the syllabus because, according to the representative of the Ministry of Education whom we met, there has been a tendency to forget to adjust the manner of teaching to the children's level of development and to treat little children as though they were schoolchildren or grown-ups.

From 11;30 to 12 it is time for lunch, after which all the children sleep until 2 p.m.

At 2:30 there is a snack: a drink and something sweet.

In the afternoon they have various teacher-directed activities, such as organized play outdoors, creative play, singing, and dancing or story reading. The oldest children have lessons in the afternoon, too.

The Good and the Evil

It is no accident that the pre-school classrooms are filled with slogans. Everywhere you look in the schools of China there are slogans. It is no accident that children are so disciplined by the time they enter the primary school.

Behind the slogans there is a vision of the world, a conception of both the country of the future and the good life, which we met time after time, in senior party officials, in day nursery teachers and barefoot doctors. It is a vision of the world consisting of a merging of socialist utopia, Chinese traditions of thought and Western doctrines of development. In schematic form this mode of thinking can be illustrated by contrasting the good life and the bad life.[16]

You do not have to be in China for long to see to what an extent the visions of the good society reflect the thinking and cultural patterns of the small but important group of well-educated townspeople -- those whom we mainly meet on our trip, as interpreters and guides, ... behind reception desks.[17]

The good life	The bad life
Harmony and unanimity	Conflict, division and confusion (the chaos of the cultural revolution)
Socialist ideals	Feudal conceptions and extreme leftism
Healthy traditions and good history	Traditional superstition and feudal relics
Morality, civilization, hygiene	Immorality, dirt, disorder
Science and rationality	Superstition and unreason
Collectivism and altruism	Individualism and selfishness
Self-control and good behavior	Absence of good manners and culture, rusticity
Secure families, secure children, a secure society	A normless society, divorces and extra-marital love
Respect for authority and knowledge	
Planning and being economical	Ignorance, backwardness, stagnation
Good technology	
All development involves progress	

Figure 1[18]

We also see it in the new pre-school syllabus. This emphasizes not only education for cultivated conduct and good morality but also the learning of a scientific outlook. Obviously the staff should organize the children's daily lives in a scientific manner, as regards everything from training in sleeping in a correct position to logical thinking.[19]

Pre-school Mathematics Curriculum[20]

To teach the children to understand numbers up to 10, and addition and subtraction. To give them a rough general idea of geometrical figures, time, space, etc. Step by step to develop the children's capacity to think logically and to develop in them correct, flexible and rapid thinking.

The youngest class

1. To know the concepts "one" and "many" and their mutual relations.
2. To compare two groups of objects with each other and to know which group has more or fewer or whether each group has the same number of objects.
3. To learn to count up to 4 in connection with concrete objects, and to be able to state the number of objects counted and, following an example with concrete objects, picking out a given number of corresponding objects.
4. To know the concepts above/below, before/after, large/small, long/short.
5. To know circles, squares and triangles.
6. To know the temporal concepts morning, evening and day.

The middle class

1. To be able to count up to 10 concrete objects and to be able to state their number.
2. To know how cardinal and ordinal numbers up to 10 are formed. To be able to read 1-10 in Arabic numerals.
3. To teach the children how, without being influenced by the size of objects or the way they have been arranged or other special features, to form a correct view of the number of up to 10 concrete objects.
4. To know rectangles and ellipses, to be able to classify on the basis of the distinct features of shapes.
5. To know the concepts of length, width and height.
6. To know the temporal concepts yesterday, today and tomorrow.

The eldest class

1. To know the constituent components of each number up to 10, and to learn to add and subtract quickly and correctly. To know the signs for plus, minus and equal. To be able to work out practical counting problems.
2. To get an idea of how one counts up and down from a specific number between 1 and 10. To learn to write the Arabic numerals from 1 to 10.
3. To distinguish between odd and even numbers up to 10.
4. With one's own body as a point of reference, to distinguish between right and left, to use measuring by eye and by a natural yardstick as methods for comparing the length, height, width, distance between, and thickness of objects, etc,
5. To know globes, cylinders, squares and rectangles, to be able to classify on the basis of the distinct features of shapes.
6. To learn to divide up a concrete object or shape, etc. into 2 and 4 parts, to know that the original concrete object or shape is larger than each part and that each part is smaller than the original concrete object or shape.
7. To be familiar with the clock, to learn full hours and half hours. To learn the calendar and know that a week has seven days, which day it is today, which day it was yesterday and which day it will be tomorrow.

Primary and Middle Schools[21]

The Classrooms.

Classes are large with 45-60 students who sit in pairs facing the teacher. Students are very attentive and often give answers in unison during practice. Students always raise their hands in a very disciplined manner - no hand waving - to be called on by the teacher and stand when responding. It is obvious that classrooms in China are not social centers; rather, they are places for serious learning. We never observed a student leaving a class for any reason, falling asleep, or acting disruptive or disrespectful.

There is a teacher's table in front of the room and blackboards on the front (and sometimes rear) wall. Lighting is adequate (bare neon lightbulbs) and very good natural lighting comes from one or two walls of windows. Walls are plastered and painted white and floors are unpainted concrete. Posters are frequently seen on walls, and sometimes student's performance on tests is recorded on a large hanging poster for all to see. Almost all rooms open to outside corridors or courtyards. Even when it is cold, rooms have little or no heat (stoves in some rooms) and windows are often open. Thus, students and teachers commonly wear layered clothing, jackets and rubber-type boots over shoes.

There are no lockers as is common in our schools. All students come to class prepared, each with a box (containing pencils, eraser, compass, straight edge, protractor), textbooks and examination type booklets for notes, seat work, and homework. Though we saw overhead projectors and tape recorders used, the primary teaching aid is the blackboard with both white and colored chalk used. The board work of teachers is excellent. Teachers frequently use small portable blackboards (e.g., 2' x 1 1/2') on which problems, solutions, or notes are written during preparation periods and which can easily be hung from the top of the main blackboard for all to see. These are very effectively used as part of the lesson presentation. There is always good rapport between teacher and students and both greet each other to begin class and say goodbye at the end. Quite commonly students are called on for board work and are supervised during work at their desks.

But what about "problem kids?" First, there do not seem to be many! In milder cases, students are advised by students (the collective), teachers, or parents when their behavior is inappropriate. Apparently this is enough to handle most such cases. If not, as in the extreme cases, students may be sent to a special adjustment school wherein they receive extra help, advice, or counseling - hopefully enough in order for them to work within the usual guidelines. This is viewed as a short term arrangement before these students are returned to their "home" schools. We were told that in Hangzhou (1.5 million population) there is but one "special adjustment" school with about 300 students. There is no evidence of physical punishment; rather, advice seems to be the main approach in a context in which a strong expectation of good behavior is implicit.

To be sure, Chinese students are kids, and kids will be kids! They push, shove, play and "horse around" - but not in the classes. We never observed students off-task in class. There is discipline (a national characteristic, we think) and control in the class and freedom and spontaneity outside the class. We note here that dating and marriage have been traditionally postponed until, for example, post-college age. While some college students have begun dating recently, parents and school personnel are "holding the line" at the middle school level.

Student School Day

The school day begins at 7:30 a.m. for most students. Students in need of extra help, counseling, or who assist with custodial work arrive at 7:00. The first period begins about 8:00 a.m. There are then four

45-minute periods up to 11:30 at which time a two-hour lunch period begins. Eye exercises are done by all students for about five minutes every morning. There is also a 15-minute mid-morning physical exercise period in which students go outside en masse to do calisthenics. Most students return home for lunch. For others, after eating it is a time for rest (naps for primary children) and/or play. Two more periods are scheduled from 1:30 - 3:30. After-school activities occur from 3:30 - 5:00: clubs, music, art, study help, and sports. Homework is common and appropriately named since the parents (the home) may help students or at least see that the work is done. Students retire early as does the whole family. Classes meet six days a week, with four of six periods on Saturday.

Teacher School Day

In urban schools, teachers frequently have two periods of instruction per day and thus teach only 10-12 periods per week (in rural areas 18-24 periods). The rest of the time is spent in preparation for classes, correcting homework, helping students, and developing tests. They also have the usual committee and Party work as well as supervision of after-school activities. Those in schools with resident students may also have evening homework supervisory responsibilities.

There is another important aspect of teaching in China, namely, the emphasis placed on "renewal" or continuing education. It is common for teachers to meet, say, a half-day each week just to discuss ways of teaching various topics. Teachers also are encouraged (and supported) to engage in further study. This may occur by attending courses offered in their school or in a nearby college or university. Correspondence and television courses offer another means of continuing education. A teacher may also be released for a long period in order to engage in full time or advanced study.

We spent an evening in the home of a principal who also teaches third year middle school mathematics. His wife teaches mathematics in a primary school. They live together with a grandmother and son in a three-room apartment of fifty-two square meters area: two bedrooms, a living (sitting) room and a very small kitchen (its only function is for cooking). This was a "typical" teacher's apartment located on campus or near to the school, which is also typical.

The principal's salary is presently ¥ 109 per month, which is at the 4th level from the top on a 10-level scale. The 1st level salary is ¥ 150/month and the entry salary (10th level) is ¥ 50/month. The principal determines raises for his teachers each year and, in turn, he is evaluated for a salary increase every two years by the Municipal Education Bureau.

We talked about the life of a mathematics teacher in China. Chinese teachers have a full daytime schedule of professional duties. But, in their "off time," they like to go for walks, listen to music, watch TV, read, just relax. They also have opportunities to go to the opera and theater. Some teachers who speak foreign languages may work as tour guides when schools are not in session.

The "average" middle school teacher's salary is about ¥ 100/month; housing costs about ¥ 4/month and electricity about ¥ 8/month (considered very expensive). Food is reasonably priced. Education and medical services are free. Teachers and factory workers earn about the same salary but, in contrast, industrial workers can increase their salaries through production bonuses. A male teacher can retire at age 60 and a female at 55 at about 90% of salary. Retirement benefits are provided by the government.

The State Council has given the new State Education Commission power to raise teacher salaries and improve working and living conditions. The State Education Commission has replaced the Ministry of Education and carries much more power under the new alignment.

The Mathematics Curriculum[22]

Primary.

The New Unified Series of mathematics textbooks is used exclusively throughout China. These are consumable paperbacks which measure approximately 13 cm x 18 cm. The books are a revision of the first texts published in 1979-80. A major revision is now underway to prepare books consistent with the new K-9 compulsory school requirement. The primary texts make some use of color, diagrams, and drawings. There are 10 texts of about 100 pages for the primary grades.

The content of the books is roughly the content of our K-8 curriculum: four basic operations on whole numbers, fractions, and decimals, with decimals treated before fractions. All four operations are extended to the negative numbers beginning in grade 5. Computation is generally more complicated than what is characteristic of our schools. Percentage, ratio and proportion are taught in grade 5, along with some statistics. Geometry is integrated throughout the grades with a greater emphasis than in our books. By third and fourth grade students are using compasses and straightedge for constructions and protractors to measure and classify angles. Algebra is emphasized very early, first with missing addends and later by solving equations such as $x + 14 = 27$, $x - 3.2 = 11.7$ and $142 - x = 83$. The introduction is formal and great emphasis is placed on finding the solutions mentally. By grades 4-5, general linear equations are solved as are word problems. Computation problems, including mental, are done in both vertical and horizontal form.

We observed numerous interesting mathematics lessons. In a grade 1 class the teacher used a transparency on an overhead showing a blue pond with green grass surrounding it. Then she stated a problem, as follows: "There are some ducks on the pond. There are two ducks ahead of two ducks. There are two ducks behind two ducks. There are two ducks between two ducks. How many ducks are there altogether?" The children thought about the problem and offered their answers, each of which was discussed. Finally, the children agreed that four ducks in a line is the best solution. Children were encouraged to explain their method of solution and various children were called on in order to consider alternate methods. In the same grade 1 class, the teacher wrote

$$1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9$$

on the board and asked the children to quickly find the sum and explain how they got it (e.g., 1 + 9, 2 + 8, etc.). The theme of that part of the lesson was patterns and many sequences of numbers were examined (e.g., 85, 80, 75, __, __, __; 12, 23, 34, __, __, __). In another example of grade 1 problem solving the teacher showed a transparency in which only 4 heads (of geese) could be seen, but 12 feet were visible. The teacher asked "How many geese are there?" The problem generated a great deal of discussion, with a few wrong answers given, but the children came to see that the solution was six geese. In general, the emphasis seemed clearly on process (thinking) as opposed to product (answers). In general, grades 1-3 classes were more informal than 4-6 classes. We also observed teachers dividing the class into small groups. Then the teacher posed problems for the groups to solve. Group scores were kept and a winner was declared, with class recognition.

In a grade 4 class of 54 children (non-key school), we observed a lesson on order of operations and the distributive property. The teacher worked with the class to see that $12 \times 3 - 4 \times 3 = (12 - 4) \times 3$. Then she worked these problems with the class:

1. $99 \times 23 = (100 - 1) \times 23 = 2300 - 23 = 2277$

2. $$\begin{aligned} 197 \times 12 &= (200 - 3) \times 12 \\ &= 2400 - 36 \\ &= 2364 \end{aligned}$$

Note: To find 2400 - 36, students

think

$$\begin{array}{r} 3910 \\ 2400 \\ -\quad 36 \\ \hline 2364 \end{array}$$

but write

$$\begin{array}{r} \cdot\cdot \\ 2400 \\ -\quad 36 \\ \hline 2364 \end{array}$$

The class then practiced on 98×17, 11×295, and 105×19. A complete lesson plan for a grade geometry class is given in Figure 2.

Figure 2

Beijing No. 1 Experimental Primary School

Grade 5 of Primary School/Mathematics Class

Objectives:

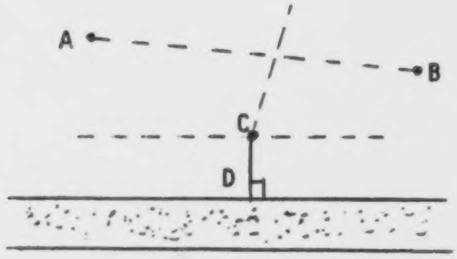
1. Help students to understand the property that "The sum of every two sides of a triangle is greater than the third side."
2. Help students to understand the method of constructing a triangle, using ruler and compass, given the lengths of three sides.

Teaching Time:

About 50 minutes

Teaching Plan:

1. Review:
    A. Ask a question, let students find the solution.



As in the figure, in the north of a river, there are two towns A and B. We want to construct a store which is 30 meters from the north bank of the river and has the same distance to the two towns. Find the position of the store and choose the nearest point to the store.

First, let students find the method to the solution.

B. Let students answer what other specific figure is formed by the set of points learned before. Give them some examples.

2. Teaching New Content:

A. Given the lengths of three sides, construct a triangle using ruler and compass.

1) Given the lengths of three sides of ΔABC: $a = BC = 4$ cm, $b = AB = 2$ cm, $c = AC = 3$ cm. Let students consider how to do the construction.

2) Let some students explain their methods. Afterwards, the teacher shows the construction on the blackboard: First construct side BC, then lead students to consider that if we can find the position of point A, we can construct the triangle. However, point A should satisfy two conditions: First, A is 2 cm from B and, second, A is 3 cm from C. According to the method shown in the review part, find the position of point A. If students can find the method and the solution, examine the results together, ask students their reasons.

3) Summarize the method of construction.

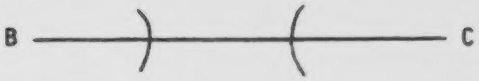
4) Give some exercises:

a) Construct triangle ABC: $a = 2.5$ cm, $b = 4$ cm, $c = 3.2$ cm.

b) Construct a triangle ABC: $a = 5$ cm, $b = 0.03$ m and $c = 38$ mm.

B. The relationship among the three sides of a triangle.

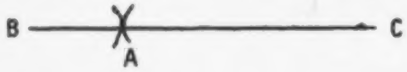
1) Ask students to construct a triangle: $a = 5$ cm, $b = 1.8$ cm, $c = 2.2$ cm. When the triangle cannot be formed, students will be confused.



2) From this, indicate that it is not true that a triangle can be constructed using any three lengths for sides. Taking 1 and 2 together, lead students to observe the relationship among b, c, and a. Find the necessary condition to construct a triangle given the lengths of the three sides.

3) Ask students if the sum of b and c is less than a, we cannot get point A.

4) To construct ΔABC: a = 5 cm, b = 3 cm, c = 2 cm. Students will see that when b + c = a, they cannot be successful.



Definitely indicate it must be $b + c > a$.

5) Can we say in other words that given three sides of a triangle, the sum of two sides must be greater than the third side?

Give students some examples, let them judge the results:

a = 3 cm, b = 5 cm, c = 1 cm

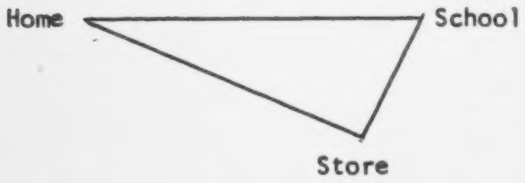
a = 4 cm, b = 3 cm, c = 1 cm

a = 5 cm, b = 4 cm, c = 8 cm

Summary: Emphasize that in order to form a triangle, the sum of any two sides must be greater than the third side.

6) Conversely, when a triangle is formed, the sum of any two sides must be greater than the third side.

Lead students to consider: Can we sum up the property of a triangle to knowledge we learned before (i.e., the shortest distance between two points is the segment which connects these points)? If students cannot see this result, give them an example: "A student goes to school. There are two ways which can be chosen by the child (as in the figure). Which one is shortest? Why?



Finally, emphasize the statement "The sum of any two sides must be greater than the third side" - the word "any" is necessary.

C. Exercises:

1) Can the lengths of three sides of a triangle be 20 mm, 3 cm, 0.4 dm, respectively? Why? If 3 m, 2 m, 1 m? Why?

2) Given the lengths of three sides of a triangle (for example, question 1), are(is) there some simple method to determine whether they form a triangle or not? (not necessary to compare three times).

3) If the ~~length~~ length of the base of an isosceles triangle is 3 cm and the length of a side is 4 cm, can a triangle be formed? Are there some special limits for constructing an isosceles triangle?

4) Given the length of a side, how do you draw an equilateral triangle? Are there some limits for constructing an equilateral triangle?

3. Summary:

The students and teacher summarize the conclusion together:

A. If you know the lengths of three sides of a triangle, how to construct the triangle.

B. The relationship among the three sides of a triangle.

4. Arrange Homework:

Consider if in a triangle a = BC = 5 cm, b = AB = 3 cm, then what is the longest limit and the shortest limit for c?

In discussions following classes, teachers described how education has changed. For example, in 1949 and after, children were "force fed" mathematics - "tell the knowledge" to use their words. But in recent years reform has included more discovery activities, games, and discussion. Other subjects included in the primary curriculum are Chinese, Moral Education (which includes how to be a good student), History, Geography, Natural Science, Art, Physical Culture, and Music. English is taught in many schools, beginning in grade 4. In general, there is no homework in grade 1, but it is common from grade 2 onwards.

In its 1984 visit to China, the US - China People's Friendship

Association's delegation reported little or no use of calculators and microcomputers in mathematics teaching (cf. Becker, et. al., 1984). Things have changed. Our delegation visited a number of primary schools with microcomputer labs. The main language used is BASIC and the use of LOGO is just emerging at this level. However, we saw no use of calculators even though we saw them on sale in numerous shops and department stores (Casio, Sharp, Texas Instruments).

Middle School.

Both ordinary and key middle schools offer fourteen courses: Chinese, Mathematics, Foreign Languages (English being the most common, but also Russian, Japanese, French and German), Physics, Chemistry, Biology, History, Politics, Geography, Health Education, Physical Education, Music, Art, and Labor Skills. As we have indicated, Chinese, mathematics, and foreign languages receive more emphasis, in terms of time, than each of the other subjects. Figure 3 seems to show that "mathematics is basic to the study of all other subjects" and provides a breakdown, by hours of instruction, for each course. Further, we see that senior 2 and 3 students have opportunities for elective study, the most common of which are Computers, Mechanical Drawing, Electrotechnics, Astronomy, Oceanography, Medicine, Classical Chinese, Literature, History, Theory of Literature and Art, and a second foreign language. In addition, Labor Skills training provides a correct attitude towards labor and a working knowledge of certain labor skills. If we add homework, it is abundantly clear that middle school education is a serious enterprise. Figure 4 provides a brief description of topics in the middle school mathematics curriculum.

Figure 3[23]

The Current Chinese Secondary School Curriculum

	Grade						
	Junior Middle School			Senior Middle School			
Subject	1	2	3	1	2	3	Total Hours of Instruction
Political Studies	2	2	2	2	2	2	384
Chinese	6	6	6	5	4	4	1,000
Mathematics	5	6	6	5	5	5	1,026
Foreign Language	5	5	5	5	5	4	932
Physics		2	3	4	3	4	500
Chemistry			3	3	3	3	372
History	3	2		3			266
Geography	3	2			2		234
Biology	2	2				2	192
Health Education			2				64
Physical Education	2	2	2	2	2	2	384
Music	1	1	1				100
Art	1	1	1				100
Hours of Required Courses Per Week	30	31	31	29	26	26	5,554
Electives					4	4	240
Labor Skills	2 weeks*			4 weeks**			

*Four hours a day.
**Six hours a day.

Figure 4[24]

Description of Topics in the Junior and Senior Middle School Mathematics Curriculum
(Yu Yuanqing and Cao Feiyu, 1982)

Junior Middle School

Year 7: Rational numbers and their operations; addition and subtraction of polynomials; first degree equations and inequalities in one variable; systems of first degree equations; multiplication and division of polynomials; factorization, fractions and fraction equations.

Year 8: Straight lines, intersecting and parallel lines; triangles; quadrilaterals, extracting root and quadratic radicals, quadratic equations in one variable; exponents and common logarithms; similar figures.

Year 9: Rectangular coordinate system in the plane; solutions of triangles; circles; functions and graphs; direct and inverse variation, linear functions and quadratic functions; equation of a line and circle; elementary statistics: mean, mean-squared deviation, standard deviation, and frequency distribution.

Senior Middle School

Year 10: Sets; correspondence; functions; power, exponential, and logarithmic functions; trigonometric functions (graphs/properties); sum and difference identities; multiple and half angle formulas; inverse trigonometric functions; simple trigonometric equations; solid figures; basic properties of the plane, relation of position between two lines, between a line and plane, two planes; surface areas and volumes of prisms, pyramids, cylinders, cones, frustrums, and spheres; quadratic curves: circle, ellipse, parabola, hyperbola; translation and rotation of axes; polar coordinates and parametric equations; spirals of Archimedes; involute; cycloid.

Year 11: Systems of linear equations (determinants of second and third order); inequalities and proofs; complex numbers: concept, operations; trigonometric form of a complex number; permutations and combinations; mathematical induction and binomial theorem; probability: equally likely, mutually exclusive, and independent events; composite experiments; plane analytic geometry.

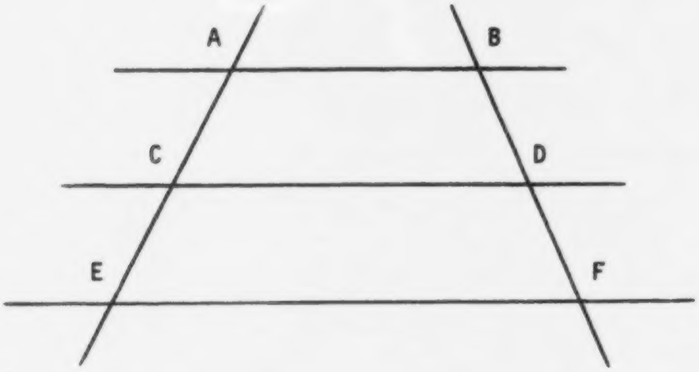
Year 12: Sequences and limits; the derivative and the differential and applications; the indefinite integral and applications; review of senior middle school mathematics.

The overall objective in middle school mathematics is to enable students to gain a knowledge of mathematics considered basic to the study of science and technology, ability to perform quick and accurate operations, and to think logically and use spatial ability as a basis for analysis and solutions of problems. The background in calculus enables 1) students who enter production after graduation to read technical books and continue their own study and, 2) students who go on to the university to study physics with calculus as a base. The background in probability and statistics enables students to use their knowledge both in a practical manner and to continue later, more advanced study.

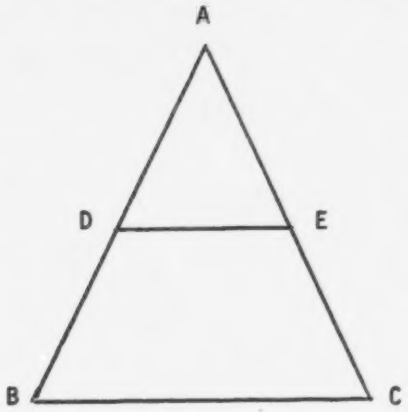
The main topics of middle school mathematics are reviewed in the last semester when students prepare for the university entrance examination. There are seven examinations for middle school graduates who intend to major in mathematics, engineering, sciences, agriculture or medicine: Mathematics, Chinese, English, Politics, Physics, Chemistry, and Biology. For graduates who are interested in social sciences or humanities, six examinations are required: Mathematics, Chinese, English, Politics, History and Geography. Examination questions for Chinese, English, and Politics are the same for both groups, but mathematics problems are given at different levels - those intending to study Science and Technology and those intending to study humanities or "liberal arts."

Our delegation visited numerous middle school classrooms, usually convening afterwards for discussion with the teacher and other staff. In general, middle school classes are more formal than primary ones. Yet, we observed a great deal of interaction between teacher and students in some instances. But the overall student protocol remains the same - be attentive, sit erect, be involved, raise hands to respond, and go back to work immediately when told to do so.

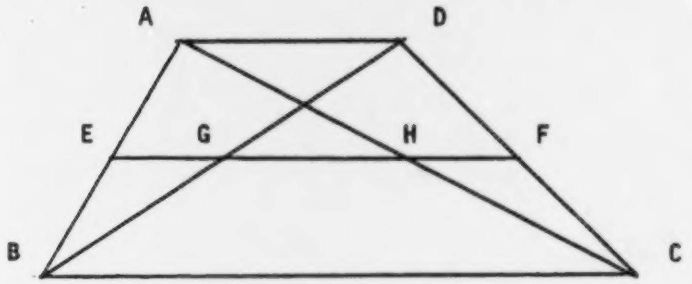
Very frequently we saw the teacher ask a series of questions and then write student responses on the board as they were given, with several or many students joining in. We observed teachers asking both "drill" and "thinking" questions. In a junior middle 2 class (grade 8), the teacher hung a small blackboard from the top of the main blackboard with the following figure:



When the teacher wrote "AB $\parallel$ CD $\parallel$ EF and AC = CE $\Rightarrow$?," the students quickly responded "BD = DF." When she wrote "AB $\parallel$ EF, AC = CE, BD = DF $\Rightarrow$?," the students quickly responded "CD $\parallel$ AB $\parallel$ EF and CD = 1/2 (AB + EF)." Next the teacher hung another small blackboard with the following figure:



The teacher then wrote "$AD = DB,\ DE \parallel BC \Rightarrow ?$" with quick responses "$AE = EC$." Next, teacher: "$AD = DB,\ AE = EC \Rightarrow ?$" with the quick responses "$DE \parallel BC$ and $DE = 1/2\ BC$." Next, the teacher hung a small blackboard with the following figure:



teacher: "$AD \parallel BC$, E, F are midpoints of AB and DC, respectively, and $EG = GH = HF$. $\frac{AD}{BC} = ?$" There followed two more somewhat more complicated figures and questions on which students worked at their desks.

The teacher was full of excitement with a smiling face as she led students into the work. She walked the aisles observing students during seatwork. We thought this lesson represented a nice example of logical reasoning from given information. The class, in general, was a mix of lecture and interaction.

We also observed a senior middle 2 (grade 11) lesson in analytic geometry. The lesson lasted 45 minutes and is summarized in Figure 5. The problems are numbers 6 and 8 of the problem set shown in Figure 6. The reader will note that the problems are difficult and are typical of the other problems in the set which students had in hand.

Figure 5[25]

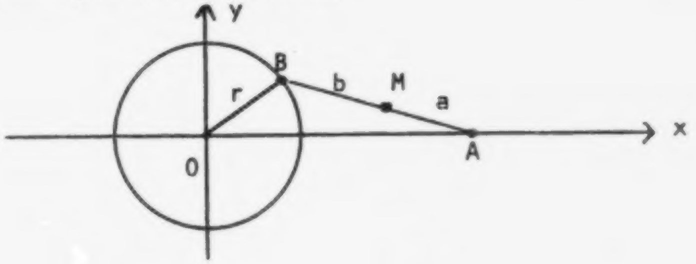
Lesson in Analytic Geometry

Second Year Senior Middle School

Background:

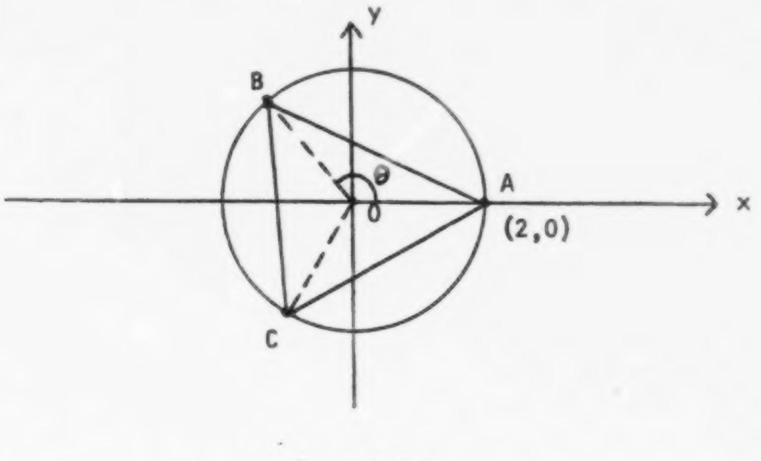
The teacher was continuing work of the previous class. He had written each of the following two problems on small blackboards (2' x 2 1/2') which were hung from the top of the main blackboard for all to easily see. There were 50 students in the class. The students had about 15 minutes to work on the problems, after which the teacher took 20 minutes to work through each of them completely. Only one solution for the second problem is shown.

1. In the following figure, let M be a point on segment BA and MA = a, MB = b. When point A is moving back and forth on line OX, point B rotates around the fixed point O on the circle. Find the locus parametric equation of point M.



2. On the circle $x^2 + y^2 = 4$ there is a fixed point A (2,0) and two moving points B and C. When $\angle BAC = \frac{\pi}{3}$ (a constant), find the locus equation of the centroid of $\triangle ABC$.

   Note: The little blackboard showed the figure below without the dotted lines and θ. These were added as the statement of the problem was discussed. Also, note that $\because$ means "if" and $\therefore$ means "then."



Solution:

Let point P, the centroid, be (x, y) and $\angle AOB = \theta$. The coordinates for point B are $(2\cos\theta, 2\sin\theta)$.

$$\because BAC = \frac{\pi}{3}, \quad \therefore BOC = \frac{2\pi}{3}.$$

Therefore C is given by $\left(2\cos\left(\theta + \frac{2\pi}{3}\right), 2\sin\left(\theta + \frac{2\pi}{3}\right)\right)$.

Since P is the centroid of ΔABC,

$$x = \frac{2 + 2\cos\theta + 2\cos\left(\theta + \frac{2\pi}{3}\right)}{3}$$

$$y = \frac{2\sin\theta + 2\sin\left(\theta + \frac{2\pi}{3}\right)}{3}$$

$$x - 2/3 = 2/3\left(\cos\theta + \cos\left(\theta + \frac{2\pi}{3}\right)\right)$$

$$= 2/3\left(2\cos\frac{\theta + \theta + 2\pi/3}{2} \quad \cos\frac{\theta - \theta - 2\pi/3}{2}\right.$$

$$= 2/3\,(2\cos(\theta + \pi/3) \quad \cos(-\pi/3))$$

$$= 2/3 \quad \cos(\theta + \pi/3$$

$$y = 2/3\,(\sin\theta + \sin(\theta + 2\pi/3))$$

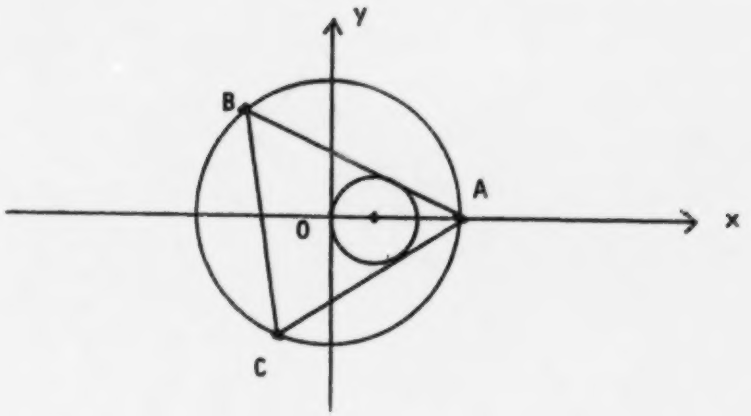
$$= 2/3\left(2\sin\left(\frac{\theta + \theta + 2\pi/3}{2}\right)\cos\left(\frac{\theta - \theta - 2\pi/3}{2}\right)\right)$$

$$= 2/3\,(2\sin(\theta + \pi/3)\cos(-\pi/3))$$

$$= 2/3\sin(\theta + \pi/3)$$

Now, $(x - 2/3)^2 + y^2 = (2/3)^2(\cos^2(\theta + \pi/3) + \sin^2(\theta + \pi/3))$

So, $(x - 2/3)^2 + y^2 = 4/9$



The conclusion is that the locus equation of point P is $(x - 2/3)^2 + y^2 = 4/9$, a circle whose radius is 2/3 and whose center is at (2/3, 0).

Figure 6[26]

Problem Set for Analytic Geometry Class

Second Year Senior Middle School

Exercises on Parametric Equations

1. Transform the parametric equation $\begin{cases} x = \sin\theta \\ y = \cos 2\theta \end{cases}$ (θ is a parameter)

   into a common equation and draw the graph of the equation on the coordinate system.

2. The parametric equation $\begin{cases} x = 2\tan\alpha \\ y = 1 + 3\sec\alpha \end{cases}$ (α is a parameter) implies

   its common equation is ________, its vertex is ________, and its focal points are ________. What kind of figure is the graph? _____

3. The coordinates of point M are two roots of equation $t^2 - 2\sqrt{6}\sin(\alpha + \pi/3)\, t + 3\sqrt{3}\sin 2\alpha = 0$.

   A. If α is a parameter, the parametric equation of the locus of point M is ________.

   B. The common equation of the locus of point M is ________.

   C. The graph of the locus of point M is _______.

4. If the parametric equation of the curve is

   $$x = 1/2\,(e^{t} + e^{-t})\cos\theta \quad \text{and}$$

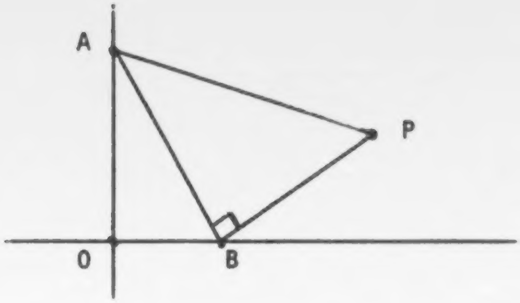
   $$y = 1/2\,(e^{t} - e^{-t})\sin\theta$$

   A. If t is constant ($t \neq 0$) and θ is variant, the equation expresses ________.

   B. If t is variant and θ is constant ($\theta \neq k\pi/2$, $k \in N$), the equation expresses ________.

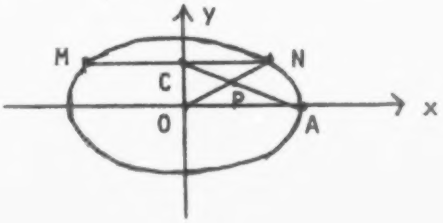
   C. Discuss the property of the equations in the two cases, and find the common points of them.

5. In the following figure, let $\triangle ABP$ be an isosceles right triangle, $\angle ABP = 90$ and $|AB| = |BP| = a$. When points A and B are moving on the x-axis and y-axis, find the locus equation of point P.

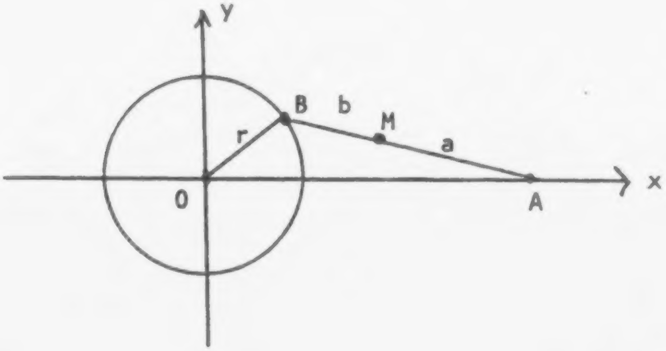


6. On a circle $x^2 + y^2 = 4$, there are a fixed point a (2, 0) and two moving points B, C. When $\angle BAC = \pi/3$, find the locus equation of the centroid of $\triangle ABC$.

7. In the following figure, in the ellipse $x^2/4 + y^2/2 = 1$, a moving chord MN is parallel to the x-axis and meets the y-axis at point C. The segments ON and AC intersect at point P. Find the locus of point P.



8. In the following figure, let M be a point on segment BA and MA = a, MB = b. When point A is moving back and forth on line OX, point B rotates around the fixed point O on the circle. Find the locus parametric equation of point M.



This class was one of the more formal ones we observed. The teacher was very much "in command" and set up the problems by asking questions and writing student responses on the blackboard until the solutions were complete. This teacher collects student notebooks every 3-4 days in which are written both the problems and their solutions. We examined a few notebooks and noticed that comments and corrections and the date he examined the work were written in red pencil. The teacher faced the blackboard much of the time and gave a casual wave of his right hand when a student completed a response to his question - we thought the practice a bit "off handed" but students did not seem to mind.

In discussion with mathematics teachers after this class, we were told that these problems are on the same level of difficulty as those of the university entrance examinations. Further, the teacher told us that about 50 - 65% of his students handle this work well, others need some help, but that only 5 - 10% need "more help and further work." We were also told that the math department chairman prepares the schedule for each teacher and approves his teachers' lesson plans ahead of time. His role also includes guidance of the younger teachers.

Some of the "older" teachers in this school still have no Bachelor's degree and, therefore, are studying in the university while teaching. Some teachers spend three hours each Tuesday afternoon preparing students for mathematics contests, some of whom have won prizes for the school. The areas in which they work are inequalities, plane geometry, graph theory, solid geometry, analytic geometry, and number theory. All students have access to teachers for extra help during teachers' out-of-class time.

There are always surprises when visiting Chinese schools. Can you imagine American secondary students translating, say, Chinese, German, or Russian mathematics materials into English? We met a teacher in Shanghai who teaches an "English Course Specialized in Mathematics" as an "optional" course in a middle school mathematics department. Emphasis is placed on reading and translation. Our delegation was given samples of translations from American college mathematics textbooks into Chinese. The samples were from the areas of Set Theory, Functions, Analytic Geometry, Number Theory, Logic and Trigonometry. Some were also of material from S.K. Stein's book Mathematics: The Man-Made Universe (1977). By any measure, we think this is an impressive activity for it requires of the translator, a middle school student, a high degree of mathematical knowledge as well as excellent facility in English.

Contrary to practices during the Cultural Revolution and immediately thereafter, examinations are now common in China. There are entrance examinations to key schools and colleges/universities and even in ordinary middle schools there are mid-terms and final examinations. Students who pass the final exam at the end of a school year are promoted to the next grade. Final examinations at the end of third year junior and third year senior are regarded as graduation examinations - those who pass can graduate. Those who do not must pass a make-up examination before promotion or graduation. Senior middle examinations are given, as a matter of policy, in Chinese, Mathematics, Foreign Languages, Physics, Chemistry, and Politics. Beyond this, teachers also make up and administer chapter tests.

Moral education is emphasized in the middle schools as a matter of educational policy. But it begins earlier in the primary schools where students learn proper behavior and a "proper political orientation." If young students give a good account of themselves and show the proper physical, intellectual, and moral development, they may become members of the Young Pioneers, an organization of younger students. Such students are easily identified by their red neckerchief (I was fortunate to be made "honorary" Young Pioneer during a visit to an ordinary primary school in Guangzhou). The objective, of course, is for all children to aspire to become Young Pioneers, though not all make it. But those that do have their own activities regularly and become leaders in the middle school.

At the middle school level, students are taught Socialist morals and learn the basics of Marxism. They are also taught to study hard, show concern for their health, and to observe the "Rules for Middle School Students" (see Figure 7). Patriotism and the importance of the group, as opposed to the individual, are also emphasized. The middle school analogue to the Young Pioneers is the Youth League, grassroots units of which exist in all middle schools. They help the Party organization to educate members in Socialist ideals. Any student of age fourteen or older can aspire to membership, and members wear an identifying badge and are frequently seen as leaders in their classes. Finally, the Student Union is an organization of middle school students which works with the school administration to schedule cultural, recreational, and athletic activities. The leaders of the Union are elected by fellow students for one-year terms.

Figure 7[27]

Rules for Middle School Students

1. Love our country and the people, support the leadership of the Chinese Communist Party, study hard and get ready to devote all your abilities to our Socialist modernizations.
2. Be at school on time. Don't be late or leave early or cut classes.
3. Concentrate your mind and think deeply in class; do your homework earnestly.
4. Be active in physical exercises and healthy recreational activities.

5. Take an active part in physical labor and appreciate fruits of labor.

6. Live simply, pay attention to hygiene, don't smoke or drink; don't spit on the floor.

7. Keep the school discipline, observe public orders and obey the State laws.

8. Show respect to teachers, unite with your school mates and be polite to everyone; don't scold or scuffle.

9. Love the collective; take good care of public property and never do anything harmful to the people.

10. Be honest and modest, and be ready to correct your mistakes.

According to Liu Jingho, a researcher at the Institute of Psychology of the China Academy of Sciences, "At a time when knowledge is multiplying, children must learn how to think, not simply to add and to subtract."[28]

Thus, these experimenters have reorganized conventional textbooks based on their own research and analysis and tried out the new materials in schools across the country.[29]

For Lio Jingho, the new approach is to help children grasp different mathematical relationships and use the knowledge to handle varied problems. She has based her new methods on years of research in child psychology and children's cognition of mathematics.[30]

Basic mathematical concepts taught in primary schools are connected to one another by underlying relationships, she says. So it is easy for children to understand different mathematical equations and solve problems when correlating or contrasting relationships are demonstrated. Meanwhile, children may learn some philosophical and theoretical ideas that are implied in the mathematical relationships.[31]

Liu's system teaches addition and subtraction at the same time, instead of beginning with addition for a few weeks followed by subtraction. That demonstrates that addition and subtraction are the reverse of each other. Thus, when children learn 3 + 5 = 8, they use the knowledge of reversibility to figure out on their own 5 + 3 = 8, 8 - 5 = 3 and 8 - 3 = 5.[32]

In traditional instruction, the concept and computation of multiples and their related problems is introduced and practiced in the third, fourth and fifth grades. However, Wang Jin, a teacher using Liu's textbooks at the Shijingshan Gucheng No. 2 Primary School, teaches all the concepts and problems at the same time to the third-graders. Like Wang Jin, about 1,500 teachers are now using textbooks written by Liu and her fellow researchers.[33]

Yao Yi, in the third-grade at Xingfucun Central Primary School, said that he and his classmates have already learned to solve problems for a fourth-year math course. Their teacher, Ma Xinlan, has been one of the pioneers in designing new ways to teach maths.[34]

Although it may take years before the new methods are popularized, Liu and Ma are both working very hard. A programme is now going on to train teachers to use Liu's textbooks, while a book on Ma's teaching methods will be published soon.[35]

"All our efforts are aimed to ensure that our children will be competent to meet the challenge of the new technological revolution in the 21st century," Liu said.[36]

The mathematics curriculum used in the primary schools throughout the People's Republic of China is outlined in Figure 8.

Figure 8

Mathematics Curriculum in Primary Schools

To teach the children to understand numbers up to 10, and addition and subtraction. To give them a rough general idea of geometrical figures, time, space, etc. Step by step to develop the children's capacity to think logically and to develop in them correct, flexible and rapid thinking. Teaching is more intense than in pre-school classes.

The youngest class

1. To know the concepts "one" and "many" and their mutual relations.
2. To compare two groups of objects with each other and to know which group has more or fewer or whether each group has the same number of objects.
3. To learn to count up to 4 in connection with concrete objects, and to be able to state the number of objects counted and, following an example with concrete objects, picking out a given number of corresponding objects.
4. To know the concepts above/below, before/after, large/small, long/short.
5. To know circles, squares and triangles.
6. To know the temporal concepts morning, evening and day.

The middle class

1. To be able to count up to 10 concrete objects and to be able to state their number.
2. To know how cardinal and ordinal numbers up to 10 are formed. To be able to read 1-10 in Arabic numerals.
3. To teach the children how, without being influenced by the size of objects or the way they have been arranged or other special features, to form a correct view of the number of up to 10 concrete objects.

4. To know rectangles and ellipses, to be able to classify on the basis of the distinct features of shapes.
5. To know the concepts of length, width and height.
6. To know the temporal concepts yesterday, today and tomorrow.

The eldest class

1. To know the constituent components of each number up to 10, and to learn to add and subtract quickly and correctly. To know the signs for plus, minus and equal. To be able to work out practical counting problems.
2. To get an idea of how one counts up and down from a specific number between 1 and 10. To learn to write the Arabic numerals from 1 to 10.
3. To distinguish between odd and even numbers up to 10.
4. With one's own body as a point of reference, to distinguish between right and left, to use measuring by eye and by a natural yardstick as methods for comparing the length, height, width, distance between, and thickness of objects, etc.
5. To know globes, cylinders, squares and rectangles, to be able to classify on the basis of the distinct features of shapes.
6. To learn to divide up a concrete object or shape, etc, into 2 and 4 parts, to know that the original concrete object or shape is larger than each part and that each part is smaller than the original concrete object or shape.
7. To be familiar with the clock, to learn full hours and half hours. To learn the calendar and know that a week has seven days, which day it is today, which day it was yesterday and which day it will be tomorrow.

Children's Palaces[38]

On a Sunday morning in Shanghai the delegation visited a Children's Palace where a wide variety of enrichment activities are provided for gifted and talented children of ages three on up to middle school. Here the delegation saw children being entertained by a magician and children practicing ballet, piano, classical Chinese musical instruments, chorus, shipbuilding, model airplane construction, accordions, gymnastics, electronics, computer programming, science experiments and a host of other activities. Our "guides" during this visit were from a class of 10-11 year old students of English.

Students are recommended for attendance by their teachers in school who feel they have high potential in particular areas. The classes are offered for minimal tuition during after-school hours and on Sundays. This particular Palace is for the most talented in Shanghai, which we could readily believe after seeing them perform. In the Fine Arts building girls of ages 9-12 were practicing ballet and acrobatics with proficient detail. One young girl performed Swan Lake for us and we were told she performed for President Reagan at the White House in 1984. Other impromptu performances were given for us by students on the piano (ages 3-7), the accordion (ages 7-10) and various Chinese traditional and classical stringed instruments (ages 7-10). Children could be seen independently practicing in hallways.

After observing ballet and various musical groups, to our happy surprise, we found ourselves in what appeared to be a mathematics classroom. This turned out to be a fairly large group of junior middle school students solving problems, led by a mathematics teacher. The problems were from the 1986 Nationwide Junior High School Mathematics Competition. In other rooms activities in chemistry, physics, and biology were underway. There was also an aeronautics laboratory complete with model planes.

Later our group was in an excellent microcomputer lab, which had what appeared to be Apple IIe's. Here were students working on a variety of problems, programming in LOGO, BASIC, and Pascal. While all projects were interesting, there was one which quickly caught our eye. The student was developing a graphical model of physical relationships; in this case he was exploring how the water level in a bathtub varies before, during, and after a bath. The student had succeeded in writing a BASIC program (computer graphics) which showed the following: 1) on the top of the screen was a graphic of water flowing into a tub from a faucet, a person going through the process of stepping into the tub and taking a bath, and the water level rising and falling or remaining constant, and 2) on the bottom of the screen was a graphical model of what was happening in 1. In the end, the person in 1 was out of the tub and the full model in 2 was displayed on the screen. (It reminded us of the beautiful mathematical modeling curriculum materials that are being developed at the Shell Mathematics Education Research Centre at Nottingham University in England.)

In the Computer Lab we met the 1986 winner of the Chinese National Computer Competition. He spoke with us, as did a member of the 1986 Chinese International Mathematics Olympiad (IMO) team which, in its first year of participation, placed third in the competition in Warsaw, Poland (the U.S.A. and U.S.S.R. had tied for first place). Both spoke excellent English and were obviously superb young scholars. We comment, parenthetically, that the U.S. Annual High School Mathematics Examination (AHSME) has been given the last two years in Beijing, Shanghai, and

Tianjin with results that surpassed both the U.S. and United Kingdom. That China is placing great emphasis on mathematical contests (at the municipal, provincial, national, and international levels) is very clear, for we had discussed this topic at several middle schools and the Shanghai Hall of Science and now we had observed another aspect of this in the Children's Palace. Mathematics competitions are also being introduced for primary school students in Beijing, with leadership coming from Beijing Teacher's College.

Teacher Preparation[39]

Primary School Pre-Service Training.

Teacher education has recently undergone significant change with great emphasis placed on both pre- and inservice preparation of teachers. During the Cultural Revolution major emphasis was placed on the political attitudes rather than academic training of teachers. This policy resulted in an abundance of inadequately trained classroom teachers. The problem was a serious one in urban schools, but a particularly acute one in rural areas. Hence, the great emphasis now on mathematics in preservice programs and in renewal or continuing education.

Unlike our American tradition, the education of primary teachers begins at about age 15! Junior middle school students who aspire to primary teaching must take an entrance examination for Normal School, the name given to institutions preparing primary teachers. If admitted at the end of lower middle school (grade 9), the student then enters a normal school for four years of training. During this period the student completes roughly the equivalent of the last three years of the senior middle school, in addition to a Theory of Arithmetic course, a "methods" course, and other "methods" training for primary school subjects. The student will also typically spend 2-3 weeks observing classes in nearby schools and later, about six weeks of student teaching. The first year of teaching is spent as an apprentice under close supervision of a senior teacher.

In general, primary teachers teach all subjects, especially in the rural areas. However, it is common for specialist teachers to handle mathematics in grades 4-6, and this is especially true in key schools. The number of normal schools (sometimes called technical schools) has grown steadily in the last few years in order to improve the elementary education of students.

Four years of education in a Normal School is probably the ideal, for one meets teachers who have had three, or sometimes only two, years of normal school training. But these same teachers are usually engaged in continuing education to formally complete their training. In many cases such teachers receive time off to attend classes with their expenses paid. Certainly a tradition has now been established to get a solid background of education before entering the classroom.

Middle School Pre-Service Training.

Under ideal conditions, preservice education of middle school mathematics teachers begins after graduation from a middle school and satisfactory performance on the university entrance examination. Students enter a Normal University, which draws and places students nationally, or a Normal College, which draws and places students locally. It should be noted that these institutions are frequently scientific universities as opposed to "teacher training colleges." Preservice teachers study alongside regular students of mathematics, taking the same courses and with the same expectations. The course of study is very rigorous and the vast majority of courses are mathematics. Figure 9 shows the course of study for middle school mathematics teacher training in Beijing Normal University, which is a key university. Note the heavy emphasis on mathematics.

Figure 9

Program of Study for Preservice Middle
School Teachers (Junior and Senior)

Beijing Normal University (Key University)

Course Title	Hours
Required Courses	
Analytic Geometry	140
Calculus	300
Linear Algebra	120
Abstract Algebra	120
Real Analysis	72
Complex Analysis	72
Probability Theory	72
Ordinary Differential Equations	72
Differential Geometry	72
Methods of Calculation	72
Program Design (BASIC or Pascal)	72
Physics	140
Mathematical Education	72
Education	72
Psychology	72
Philosophy	72
Economics	72
History of China	72
Foreign Language (English, Japanese or Russian)	280

Six - Eight weeks of practice teaching in the middle school.

Optional Courses

(The student chooses at least 4 courses from the following list.)

Course Title	Hours
Projective Geometry	72
The Foundations of Geometry	72
Topology	72
Algebraic Topology	72
Partial Differential Equations	72
Theory of Groups	72

Theory of Rings and Fields	72
Conical Groups	72
Mathematical Logic	72
Theoretical Mechanics	72
Theoretical Statics	72
Stochastic Processes	72
Theory of Numbers	72
Functional Analysis	140
History of Chinese Mathematics	72
Theory of Sets	72

China has no counterpart to our professional education sequence of course nor to our liberal arts requirements. To be sure, there is a "methods" course and student teaching. But beyond that, students' time is pretty much spent in strictly academic work: 63% - mathematics, 12% - foreign language, 6% - physics, 6% - mathematics "methods" and education, and 12% - psychology, philosophy, economics, history (which comprise political studies). (Note: practice teaching is not included in these percentages.) Typically the "methods" course is concerned with methods of teaching algebra and geometry and making and using teaching materials. Readings in cognitive psychology may also be included. Noticeably absent is any reference to remedial courses so characteristic of our own colleges/universities. All courses are taught in the mathematics department by its staff or by instructors from outside the department who come to teach courses for the mathematics department. At Yunnan Province Normal University, not a key university, an almost identical program of studies is required (cf., Becker, 1984). The program of studies leads to a Bachelor's degree and there is no formal counterpart to our certification process.

The program outlined in Figure 9 is the ideal, as mentioned. In fact, Chinese mathematics educators told us they have a serious problem of inadequately trained middle school mathematics teachers (though members of our delegation wondered about their meaning of the term "inadequate"). During the Cultural Revolution with its emphasis on political attitudes, at the expense of academic training, apparently many students who completed senior middle school were assigned to teach lower middle courses, and students who only completed lower middle were assigned to teach primary school courses. Thus, we see the importance of inservice training now - to raise the level of mathematical competence among teachers who entered the profession during the Cultural Revolution.

The delegation visited the Hangzhou College of Education. Here was found an extensive inservice program for middle school mathematics teachers. In fact, the college deals almost exclusively with inservice programs (full or parttime). Other approaches to inservice include correspondence and TV courses. Incentives are given to teachers in the form of tuition waivers and salary increases. Many teachers attend 3-5 years to upgrade their backgrounds.

The government is experimenting with other approaches to handling the shortage of good teachers. It is a problem which will become more critical in the future since a large number of middle school teachers are nearing retirement and it may be difficult to replace them by younger teachers. As an incentive to enter teaching, the government offers an opportunity to senior middle graduates to take the university entrance examination early. Thus, if they do not pass, they can retake it at the regularly scheduled time which still permits fall admission. In other cases, a greater opportunity to get an apartment serves as an incentive. In another development, the State Education Commission is offering stipends or loans (not to exceed ¥ 400) to students who go into mathematics teaching, with a stipulation that the loans need not be repaid if the student agrees to teach for at least five years or to teach in a remote area. Since there is an attitude that to teach in the schools is to make a sacrifice in salary, the State Education Commission is also working out schemes for increasing teacher salaries.

Summary and Conclusions[40]

Our delegation travelled in China for nearly three weeks. During this time we visited many schools and observed instruction in numerous classrooms at all levels. Though most of the schools we visited were key schools, we sense that many of our observations might very well be characteristic of ordinary schools too. Unfortunately, we spent very little time in rural areas and no time at all in areas that would be considered remote.

Some of our visits provided time to discuss what we had seen and others were more hurried that we would have liked. All this is understandable since the demands of our schedule were substantial. Of necessity, we also had other diplomatic and social functions in addition to the professional activities. As immensely nice and enjoyable as the other functions were, they took time from our professional schedule. Then, too, we communicated through the medium of translation which, all things considered, reduced the speed and accuracy of the information flow even though the translators were excellent. At times, plain and simple fatigue took its toll.

Even so, there is no doubt in our minds that the Chinese have made great progress in implementing educational reform, that their students are learning a great deal of mathematics, and that, while doing so, they enjoy school and life a great deal. There is also little doubt that at any grade level, the students we observed seem ahead of our own in terms of both topics studied and mastery thereof. Since none of us believes that Chinese youth are innately more intelligent than our own, possible explanations lie elsewhere. These we mention briefly below:

1. Chinese students try harder. They appear to study for long hours and have fewer social/recreational diversions. Their curriculum is more intensive and their teachers seem to give no more, and maybe less, homework than our own.
2. They spend more time in mathematics classes - we estimate 10-15% more time, not taking enrichment classes into consideration in either case.
3. Parents, teachers, and society in general expect more, so naturally there is a tendency to produce more. More than a few of our group have commented that they will now raise their expectations of students in their classes and let the students know it.
4. A healthy mind in a healthy body . . . this is something seen emphasized everywhere we visited. In contrast to Chinese students, our own seemingly carry the burdens of modern society with them into classrooms. We refer to drugs, alcohol, and the likes of over indulgence in sugar and fast foods, not to mention the breakdown of the traditional family, single-parenting, latch-key children and the anguish of dealing with too many options. We also have great societal emphasis on style and appearance, popularity, money and romance. These would seem to interfere with establishing a sound, basic confidence about oneself which plays a vital role in learning.

5. Chinese teachers feel more positive about their jobs and their role in society. This may also play a role in students' learning. This is not to say that their teachers do not experience the frustrations of our own, for they speak about the need for better salaries, living conditions, and status. Still, on balance, we sense that they feel more satisfied than our teachers.

China did not participate in either the First or Second International Mathematics Studies (FIMS, SIMS). But if it had, we wonder whether achievement data may have shown results consistent with that of the Japanese in comparison to the United States. Horvath (1987) writes that the results of the FIMS and SIMS studies confirmed what she had earlier observed (emphasis added) in Japanese classrooms and had concluded from interviews with students, teachers, and counselors (p. 367). Like Horvath, we feel "that more than minor adjustments are needed if the level of American junior and senior high school mathematics achievement is to improve" (p. 367).

We have a strong feeling that if the current educational policies remain in place and newly proposed ones are implemented, China will have a large number of highly and excellently trained young people who will make possible the realization of it's drive towards scientific/technological development and modernization. Some twenty-five years ago there was great concern in our country about "catching up" with the Soviet Union by improving our mathematics and science programs. Presently we are amazed at the technology and overall mathematical literacy of the Japanese. We wonder whether we may be pondering the great progress made by the Chinese in another twenty-five years. Finally, Davis and Romberg (1979) have commented that:

> There is little to be gained, and much to be lost, by comparing national systems in an "our-system-can-beat-your-system" frame of mind. The important gains are to be had only if each nation tries to learn from the other . . . . One road toward (that) improvement may be the careful study of what other nations do, in the hope of learning from them. (p. 29)

Perhaps we can learn some lessons by studying the practices in mathematics education in the People's Republic of China.

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6. *Ibid*.
7. *Ibid*.
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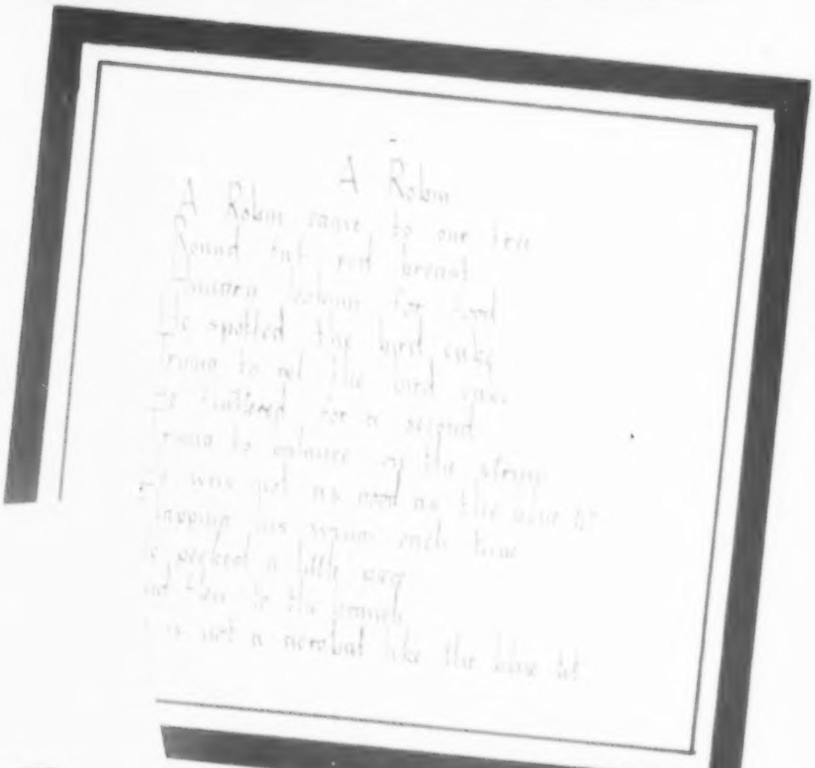
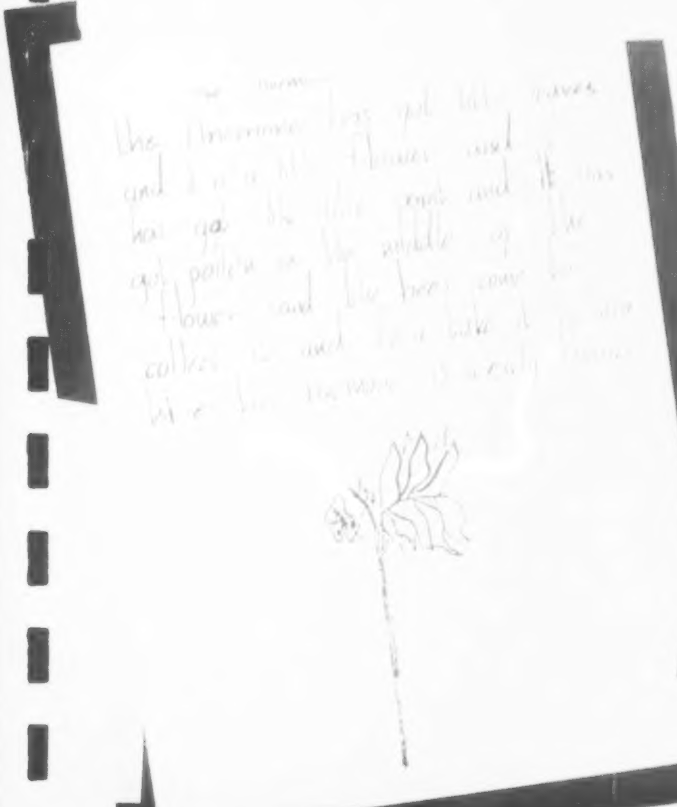
SEEDBED

Work by
elementary school
children from Dalton
Foljambe School,
Rotherham, Yorkshire

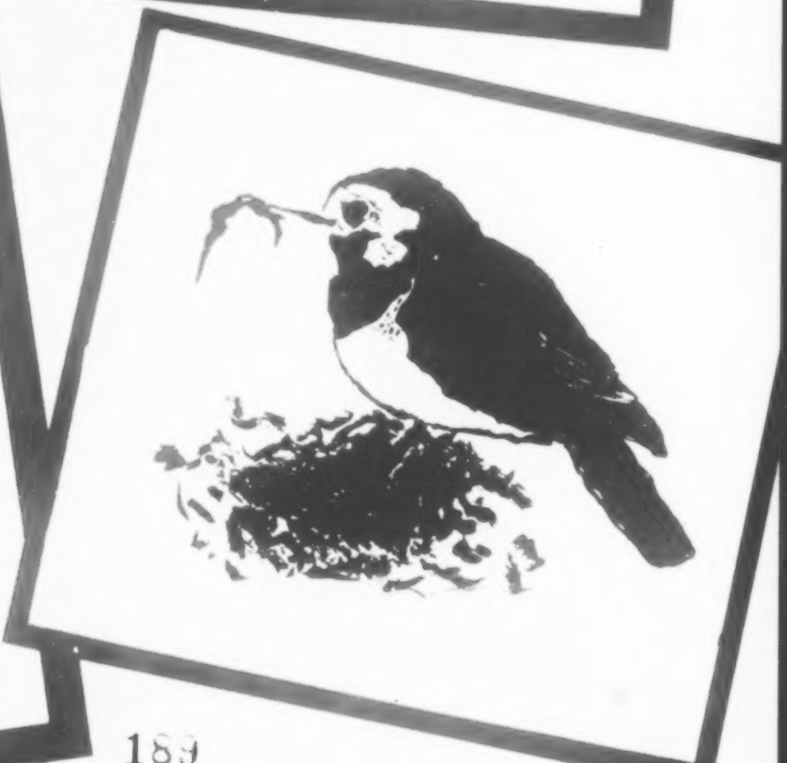


A Robin

A Robin came to our tea
Round fat red breast
Hunting [illegible] for food
He spotted the bird cake
Trying to get the bird cake
He fluttered for a second
Trying to balance on the string
He was not as good as the blue tit
flapping his wings each time
he pecked a little way
and then to the ground
He is not a acrobat like the blue tit



[illegible]
The [illegible] has got [illegible] leaves
and [illegible] flower and
[illegible] got the [illegible] and it has
got pollen in the middle of the
flower and the bees come [illegible]
collect it and then take it [illegible]
[illegible]



SEEDBED

NUMBER 31

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Teachers' Center Project

SIUE

Southern Illinois University
at Edwardsville

INTRODUCTION

Welcome to this, the latest issue of **SEEDBED**. Presented here is a compilation of articles written by SIUE students who spent time visiting British schools during the summers of 1986 and 1987. As with **SEEDBED 24**, you will find in **SEEDBED 31** rich experiences in quality, caring, and thoughtful education.

It is with great appreciation that I thank Sylvia Johnson, senior lecturer in Maths Education at the Sheffield Polytechnic, Sheffield, England, and David Lingard, head teacher of Northcliff Comprehensive School, Conisborough, England. It is their guidance that enabled us to participate in such marvelous experiences. (Readers are advised to look at **SEEDBED 27** to find some of the innovative maths ideas shared at SIUE by Sylvia and David.)

Thanks also to the head teachers and teachers who opened their schools and hearts to groups of curious Americans with their many questions asked in those "strange" accents, and to the families who opened their doors and made us part of their families.

We happily share our experiences with you.

Barb Goldenhersh

Barbara Goldenhersh
Editor

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IMPRESSIONS OF BIRK HILL SCHOOL: NURSERY AND INFANT SCHOOL ECKINGTON, DERBYSHIRE, ENGLAND

Oleta M. Kartmann

A nursery and infant school in England usually includes children from age three up to and including age seven. The children in Birk Hill School in Derbyshire are typical of many of the children in British school systems. They are from the immediate area of the village of Eckington in Derbyshire. Many of the families are employed in nearby Sheffield, a city of approximately 500,000 population. The children are neatly dressed, clean and attractive. Most of them appear to be well cared for, much loved children.

In Birk Hill School there are represented many of the recent trends in British education. Beset with funding problems, but with a genuine desire to improve education, educators are striving to move away from the old authoritarian policies to more open classrooms with integrated subject matter and problem solving approaches. Children are treated as individuals who are entitled to as much respect and attention as any other member of the human family. The atmosphere in the classroom seems relaxed, casual, and only semi-structured, but when one thinks about all the planning that goes on to achieve this atmosphere, it is clear that there is nothing casual about it.

The nurturing, caring, atmosphere of Birk Hill School begins with the head mistress, Mrs. Jane Garfield. Ms. Garfield came to Birk Hill three years ago (1983) when the former head mistress retired. They have since added new buildings, and then a new wing to an existing building. A new method of teaching has also been added. This method is called in Mrs. Garfield's terms - an integrated day. The most basic explanation of an integrated day is to say that all teachers are teaching all things at all times possible. No opportunity is lost to make a student aware of the many problems and ideas that exist in his immediate environment. Science is based on problems that exist in the natural, physical environment or can be constructed easily within the school environment. While working on science, the child is also using handwriting, spelling, reading, language, and possibly math skills. While working on "maths," he will be using the same previously mentioned skills in addition to whatever special maths thinking he is doing. This does not sound drastically different from what American teachers and students do every day. However, where American schools set up their class day into periods - a period for spelling, a period for language, a period for handwriting, and perhaps a double period for reading (in primary schools) - the English infant school will be working on all of these skills at the same time during an extended period of the day. Specific instruction is given to small groups or individually, as needed, after giving general directions for the morning or afternoon activities. When a child is finished with one activity, he moves on to another activity he is expected to do that day. The teacher does not tell the children when to move on. This is determined by the child's pace. When he finishes the activity, he moves on. If he is slow getting finished, he may be late getting to lunch, or wherever the next project takes place. Most of the children proceed fairly well on schedule, but not because they are afraid of missing lunch. A child moves on because the work he does is planned for his level of ability so that, in a given time, he will be able to accomplish what is desired.

There is no grouping of children into classes by ability. There is no double promotion or retention of students. All seven-year-olds, for example, are in the same class. The ability grouping, when it occurs, comes in the various levels of small group activity.

In the nursery class, learning experiences are conducted much as they are in American schools. There is a brief morning assembly. During this time children may bring new things to the attention of the class and the teacher. The attendance is taken and children are given their assignments. Color coding is used to help the children find their assignments. In the nursery each child has a color and a picture of some familiar object in that color to designate everything that is his from the hook where he hangs his coat to the table where he is to work for the first work period.

During the morning these three- and four-year-old children have many manipulative materials with which to work. They will count them, sort them, build with them, or do anything else which an imaginative teacher can think of to further the children's experiences with thinking and problem solving. There is also a "water table" and a "sand table" where the physical properties of those two materials may be experienced and experimented with by the children. Measuring cups, funnels, bottles, cans, shovels, scoops, etc. are standard equipment for these areas. The equipment can be used inside the classroom or outside on their own nursery class patio. The children wear plastic aprons when working at the water table. Spills of either water or sand are expected and the children do their part in the clean up. The water and sand tables appeared to be standard equipment for all the classrooms up through the seven-year-olds.

An example of integrated teaching in the nursery was observed in such activities as finger plays while the teacher and students sang "The Grand Old Duke of York" who marched his men "up the hill" and "down." Other songs gave the children opportunities to count as they sang, while discussions of the songs gave opportunities for verbal expression. During this particular assembly time there was also a sort of "guessing game" going on where the teacher "made a face" to represent, i.e., how a grapefruit tastes, with the children guessing the fruit she had in mind. In various ways, with songs and stories, many concepts were presented to these three- and four-year-old children.

In the nursery class there must be an adult for every ten children. The nursery at Birk Hill had about twenty-four students, a teacher and a "nursery nurse." The nursery nurse is the equivalent of American teacher aides. She must have two years of training for the position. While the teacher is responsible for the structure and organization of the classroom, the nursery nurse helps with the teaching as well as supervision of the students. When a "special needs" child enrolls in a nursery classroom, or any other classroom, a trained aide is assigned to that classroom to help the teacher meet the needs of that particular child. This is similar to "mainstreaming" of Special Education students in American schools except that very often the classroom teacher in the U.S. must manage without an additional helper.

As one proceeds through the day, observing children and teachers at Birk Hill School, one notices many ways that this school differs from most American schools. Some of these differences are based on trying to make the most economical use possible of available funds. Other differences seem to be derived from an evolution of thought away from the authoritarian role of the teacher toward a more congenial "stimulator of learning" role. Often the teacher does not seem to tell the student what to do; she/he asks, "What else do you think you could do with that?" Or, "Could you construct this in a slightly different way?" And, "What do you think you should do about this?" The teacher tries always to get the student to explore an idea until he is satisfied that he has gotten as much out of it as possible. If a child has a wrong answer, he is not criticized or "marked down;" but it is suggested instead that he try a different way of getting his answer. Every effort is made to help the student learn by his mistakes without damaging his self-respect in the process. The student is not rushed to obtain an answer or to formulate a concept. This is possible, perhaps, because there are no formal lectures, and except for the brief assemblies, there are very few large group discussions where many children are waiting for one child to answer a question. Small groups of children work on problems which are suggested by the teacher. Many little notebooks are used by the six- and seven-year-olds wherin they record their ideas or their solutions to specific problems.

One feature of the "integrated day" which results in a very economical use of funds for equipment is the organization of the class schedule. While Language Arts (spelling, handwriting, reading, mechanics of language, creative writing) are being taught, there may be "maths" activities, art, or science projects going on as well. This requires a very alert and active teacher to make sure that all children are getting their share of time at each of these activities. It requires a lot of planning by that teacher to assure that the work of each day is important and worthwhile to the students. The economical features are these. Instead of a classroom supply of Cuisenaire Rods, only enough for a small group at one table is needed. At most, two groups will be working on maths at one time. If the maths activity has something to do with measuring, only one set of equipment is necessary at any one time. The children take turns. They move from one activity to another as stated previously. Everyone has the opportunity to use the equipment as needed. There are enough different tasks that all children will be working, but with a variety of materials. Even the few textbooks that are used are shared in "turns." Believing, as these teachers do, that a considerable amount of "hands on" experience with concrete materials is necessary for optimum learning, this "taking turns" with equipment allows for a greater variety and quality of materials to be available.

Although very few of the textbook type of materials are in use in English schools, some math and phonics books were in evidence at Birk Hill. Much more in use were "Task Cards," some commercially made, but many more that were teacher-made. Also in use were teacher-made notebooks into which the child copied problems, phonics exercises, sentences, stories, etc. according to the particular activity. (A separate booklet was used for each subject or type of activity.) The deputy head teacher explained that she often preferred to create her own task cards, as she could more accurately gear the work to the needs of individual children.

In Birk Hill School as in other British schools the emphasis in learning is not on any particular subject matter, but on learning itself. There is much concern about stimulating children to think, to consider alternative ways of solving problems that meet them on an everyday basis. On the other hand, reading, for example, is treated as any other area of learning. The children are given many, many opportunities to learn to read. By various methods - phonics, sight, context, oral and written language experiences - reading skills develop. They evolve. They become usable skills. By whatever process, when the child wants to read and is mature enough to read, reading "happens." From the nursery school with emphasis on verbal expression and the various concepts, up through the oldest of the infant school (the seven-year-olds) the philosophy is that there are many areas of learning and many ways to learn. Reading is one of them, but not the only one. The children are not forced to read a textbook or storybook in which they may not be at all interested, simply because with this story there is a set of "skills" which must be learned.

While learning to read, the children write their own stories. With the teacher's help the children correct their writing. Then the child may illustrate his story. Often it is rewritten in his very best handwriting, then bound into a book which he will carry to a younger class. He will leave his book there to be read by them again, or used as a picture book. What better way of motivating a student to read than to have him read his own work to others? There were text books available at Birk Hill for teaching reading. Exactly what use was made of them was difficult to determine.

With the emphasis on guided learning rather than enforced learning, there appeared to be very few problems of discipline. The Derbyshire Education Council in fact had decreed that corporal punishment was OUT! This coincided exactly with the views of Mrs. Garfield, the head mistress of Birk Hill. In fact, discipline appeared to be a very minor problem. At all times a very polite, respectful attitude was demonstrated by students toward teachers and by teachers toward students. As for students' behavior toward each other, only one incident during the day merited isolation and a reprimand from Ms. Garfield. Only one out of nearly two hundred students is not a bad record for the day.

From the moment one walks into Birk Hill until one leaves at the end of the day, one feels the child-centeredness of the place. The walls are covered from floor to ceiling - literally - with children's art. But rather than being twenty-five replicas of the same idea, the children's work is centered around a certain theme. Two whole walls are given over to the story of Robin Hood in Sherwood Forest. Parents help to assemble the project. Teacher direct the project. Children make the parts of the project. As the art activity goes on the children are also being taught what a forest is, who Robin Hood was, where Nottingham and Sherwood Forest are located. Much more than just an art project has been completed when at last the walls are filled with the story.

Another very child-centered display which exhibited the necessary characteristics of integrated learning was a collection of Teddy Bears. Located in a corridor, there were bears of all sizes. Included in the display were a tape measure, yard stick, and a math balance. Several large cards held such questions as: How many little bears will weigh as much as the big bear? How big around is the largest bear? How tall is the smallest bear? And various other questions which explored the weight, appearance, height, circumference, etc. of the collection of bears. By the end of the day the tape measure, balance, and yard stick, as well as pencils and notebooks had been well used.

Probably the most outstanding feature, among many features of Birk Hill School, was not the art, or learning centers, or the nursery class, etc., but the high degree of cooperation, respect, and caring exhibited by the students, the teachers, the parents and the support staff of the school. There were walls and room dividers throughout the building that separated each area from the next; but there were no walls or dividers large enough to separate the people from each other, or from the purpose for which they were all there. The purpose for which all were working was the education of the children. From all evidence this purpose was being fulfilled!

A VISIT TO A BRITISH SCHOOL

Virginia Small

What a wonderful experience to visit classrooms in Sheffield, England!

Our first impressions were of the many displays of the children's art work all over the school. It was obvious that childrens' work was important! There were many shelves of books in the halls and classrooms with a large variety of stories to interest any and all readers. This school was an Infant School which included a nursery class of about thirty children and four classes of a combination of five- to seven-year-olds. The five-year-olds in each of the rooms were called the reception class. All children remain with one teacher for three years. Each of these classes had about twenty-nine students.

Class started with the children gathering in a reading nook area where the register was called and attendance marked. Announcements were made at this time and a little sharing took place. A field trip was discussed that would include the whole school. The children were presented with a meaningful thinking problem. Would it be more economical to have each classroom have a coach (bus) or, if they all divided up on coaches, how many would be needed for all their children. Each coach would cost 200 pounds and hold sixty children. Six mums (moms) would be allowed to accompany each class. The students easily decided a coach for each class would cost too much and there would be empty seats. The children were encouraged to estimate how many coaches they would need. They guessed about three. After the discussion the work of the day was explained and the children went into the room to begin.

The children were each encouraged to begin their stories. All the children write stories every day and each has a small "dictionary" to write in words they want to use but don't know how to spell. Some children were working in small booklets stamping in clock faces and drawing in the minute and hour hands for the times they were to put on their clocks. Other children were reading stories to themselves and to the teacher who was keeping a record in her notebook. The art project used dry tempera in containers. the children dipped their wet sponges into the dry tempera and then made designs by pressing their sponges on their paper creating their own patterns.

We were visiting England during the time of the World Cup Championship and a display included this current event with some questions for the children to see if they could answer.

1. Where is Mexico?
2. What is happening in Mexico at the moment?
3. How often is the World Cup held?
4. In what year will the next World Cup be held?
5. Who has England played?
6. Who did England beat?
7. What was the score?
8. Who is this man?
9. Name three World Cup teams.
10. Draw the Mexican Mascot.

During the morning, milk is provided for those who want it. The milk case is right there in the room all morning. At 10:30 all children go out to play with one teacher in charge. The other teachers all go to the lounge to enjoy coffee and biscuits and relax. At 11:50, the children pick up all their materials and go to the reading nook to hear some stories while the dinner supervisors clean and set the tables. Some of the children went home for lunch. Those staying were served family style at their tables by these dinner supervisors. Their lunch period was one hour and twenty minutes. Teachers have many options as to staying at school, going home, taking an exercise class, etc.

The afternoon schedule is much the same, continuing with projects that were started at the morning session. At PE, the children took off their clothes down to their underpants and lined up to go to the gym. The complete exercise equipment was set up by the children. All seemed quite responsible, moving from station to station and quietly working out. There was another 15 minute break time in the afternoon again with one teacher in charge of the children and the rest of the teachers going to the lounge for coffee. At about 2:45 the children began to put away materials and returned to the reading nook, usually to hear stories. On this particular occasion I read them stories, told them a little about our country and answered their questions. They all thought I was the one with the accent. School was out at 3:15. Most of the children were picked up by parents or walked home.

This was a wonderful chance to share in another classroom and discover what I had suspected, children are probably about the same the world over and teachers share a common bond of responsibility and understanding.

A BRITISH TEACHER SHARES SOME VIEWS ON AMERICAN EDUCATION

David Floyd

"Teaching is a lonely business", so wrote Dan Lortie. I'd always found this part of my education studies the hardest to understand. Schools are very difficult places to find any kind of solitude in, let alone isolation! Sometimes we crave peace and quiet, to be on our own, but teaching, by its very nature, is a social activity, so what exactly did Lortie mean?

A year of teaching in the U.S.A. and I think I've found the answer! Lortie was an American writing about American teachers. Their professional worlds, while superficially similar, is utterly different from their British counterparts. This article is an attempt to explore some of these differences and their consequences. It is premised on the assumption that American teachers are far more professionally isolated from their colleagues. I base this observation not just on my own experience, but on the many conversations I've had with fellow Fulbright Exchange teachers.

Recesses

The pace of American education to any newcomer is bewilderingly fast. The lack of recesses strikes particularly hard on one such as I who is used to just four teaching periods of 65 minutes per day, each one being punctuated by a recess of at least 15 minutes. My U.K. schedule ran thus:

Homeroom	(25 minutes)
Period 1	(65 minutes)
Recess	(20 minutes)
Period 2	(65 minutes)
Lunch	(70 minutes)
Period 3	(65 minutes)
Recess	(15 minutes)
Period 4	(65 minutes)

Very leisurely, very English, but perhaps a more efficient use of time and an acknowledgement that few children are capable of long sustained spells of academic work without some kind of decent break. I found that the last two periods of my U.S. schedule took a heavy toll: Period 5 the students were more fractious than at any other time during the day; last period, period 6, the students were generally too tired to bother being fractious and too tired to learn. Recesses in the U.K. mean time for tea and the sanctuary of the faculty lounge. The chance to chat with one's colleagues, to chase up problems, to plan for the next onslaught, to catch up on the numerous information boards which cover most of the faculty lounge walls and which serve as a continual reminder that one is but part of a much, much greater whole. Nearly every member of the faculty repairs to the lounge at least three or four times a day. It is the place everybody assembles first thing every morning. It is the crux of the communication network of any school in the U.K. and this daily gathering promotes a sense of community which was nowhere near as obvious in any U.S. school I visited.

Testing/Grading

Before I went to the U.S., I found it hard to believe that any other country could ever allow their curriculum to become so assessment dominated as the U.K. Virtually all students age 16 take public examinations which are set by Examination Boards, first established in the 1880's by the Universities. Their primary purpose is to select those students capable of pursuing a further two years of academic study in just three specialisms, known as Advanced Level subjects. Most 16-year-olds will sit examinations in usually 7 or 8 of the subjects they have studied. Only about 20% will achieve a sufficiently high standard to go on to a sixth form for two years of preparation for a further round of public examinations. Protracted examinations in just 3 subjects are the final hurdles to gain a place at University or College. Of the 90% who take public exams at 16, only 13% eventually make it through and reach the standard which entitles them to some form of higher education post 18. Mass education does not exist in the U.K. after 16; it is solely geared to producing an academic elite to run the

Universities and the professions. The majority of student population, 70%, leaves after public exams to go into employment, or to join a government sponsored job training scheme or, sadly, to become unemployed. The statistics for my own school's post 16 students for 1986 will illustrate the fate of a typical 16-year-old cohort in the U.K.

53%	Government Sponsored Job Training Scheme
19%	Full Time Employment
16%	Sixth Form or Further Education
5%	Unemployed
6%	Unknown (left area, etc.)
1%	Stay at home

Whatever criticisms are made of the U.S. education system, whatever comparisons are made with the U.K., the fact remains that the U.S. education system is hugely successful in persuading people to continue their education beyond the statutory leaving age. I see the fundamental differences between the U.S. and U.K. systems rather in terms of the difference between a marathon running race and a 4 mile horse race over the jumps. In the marathon the 90%+ of starters actually finish the race albeit recording different times. In a horse race over the jumps, the majority do not stay the course but usually fall at one or two of the more severe jumps 2/3rds the way round. You do not need me to tell you into which category the U.K. education system falls. Perhaps the real culprits in the U.K. are the people who make the fences so high, i.e. the Examination Boards.

However I do think there are lessons to be shared with American colleagues over the positive impact which the U.K. public exam system makes in certain areas:

(1) Academic Standards

I found it hard to accept that there was no cross checking of my standards with other teachers in school. True, I had to explain to the Principal the criteria which the students had to meet to pass my class, but this said nothing about the standard of attainment that they had to reach. I made no mention of the skills I expected them to master nor did I have any idea whether this was appropriate or relevant for the 10th or 11th Grades I taught. Teachers were constantly being exhorted by both National Government and County Board to have high expectations meant in an academic sense. In the U.K., Exam Boards identify precisely the skills required to achieve a satisfactory grade at 16 and weighting given to each skill. There is a universally applied standard to focus on in every subject. Teaching styles may vary but the academic demands made upon students do not vary. In the U.S., I found it hard to accept that my colleagues could demand different standards and focus on different skills for the same grade level. Somehow it offended my English sense of justice; it didn't seem cricket!

(2) Social

In the U.K. the teacher has a different relationship with his students. He is not the enemy, the Exam Board is; he is a partner with the students and together they are both trying to outwit the enemy. In the U.S., because the teacher is the sole arbiter of a student's progress from one grade to another, he is quite clearly the enemy. I was totally unprepared for the way my grades were continually challenged, for the level of plea bargaining that signalled the end of every quarter. Worse still the sophisticated level of cheating which the system seemed to have spawned. Given the loose rules of the game and the overwhelming power of the teacher over his students, then I guess the law of the jungle is bound to prevail. Ethically, I fear such a system is almost certain to have implications for future morality.

Curriculum Development

I mentioned earlier that teaching was a lonely job in the U.S. The partnership model which operates between teacher and student in the U.K. extends to teachers themselves and is fostered by the public exam system. Preparing groups of students for the same objective inevitably encourages people to share ideas and materials. This co-operation is strengthened even more by the fact that each examination subject contains a major element of school based assessment. Typically, to take the case of history, 2 exams make up 60% of the final grade; school assessments make up the remaining 40%. In my own school this consists of seven pieces of work, done in class, designed to test seven particular historical skills. These seven assessments are produced collectively by the teachers at the school, sat by all the students taking the subject, and marked by teachers at the school. Samples are sent to the Exam Board to cross moderate each school. This system promotes a cross fertilisation of ideas and ensures a sense of professional community within departments.

Professional Autonomy

Despite the hold of public Exam Boards, teachers in the U.K. have far more autonomy over what they teach and how they teach it. Providing what they teach reaches the agreed standard, content and delivery remain firmly in the hands of the subject department. Such autonomy has meant that the curriculum is very responsive to changing student needs and interests and, crucially it has to be. Given that a significant proportion of students realise by the time they are 14 or 15 that they will never jump the exam hurdles, teaching methods and curriculum have to be very imaginative and promote intrinsic satisfaction. The fact that U.S. teachers play god and stop promotion to another grade does not encourage curriculum development. I found the curriculum I experienced pretty arid with the emphasis on motivating students through extrinsic rewards rather than promoting intrinsic interest. I suspect the stagnant nature of the curriculum is fostered by an obsession with testing. County CRT tests were administered at the beginning and end of every semester. Test and quizzes seem a frequently deployed weapon in a U.S. teacher's armoury. There seems nothing particularly wrong with the frequency of such tests, rather the nature of these tests.

They tended to promote a commodity view of knowledge since they seemed to test only lower level intellectual skills such as factual recall or base concepts. Higher order skills such as analysis, synthesis and problem solving seemed noticeable only by their complete absence from any test I saw. The reasons for this seemed to lie in the frequency of testing which forced teachers to test that which it is easy to test, i.e. facts. Skills of analysis demand far more complex testing methods which also are very time consuming to grade. The expectations of students, who are very product orientated, encouraged an obsession with facts. Process skills are harder to teach and to identify as something real. Regurgitating facts is for the student solid reassuring evidence of learning. Also direct political control over the curriculum and its delivery seems to contribute to this unhealthy preoccupation with low level learning. The drive to raise standards in schools demands clear, unequivocal evidence that this is happening. Learning facts is easy to measure and comparisons are simple to draw. Factual recall is a pretty uncontentious criterion; the student either knows it or he doesn't. Comparisons can then be safely made, free from the fear of litigation. Public pressure on teachers to deliver something easily quantifiable is in danger of reducing education in the U.S. to a form of trivial pursuits.

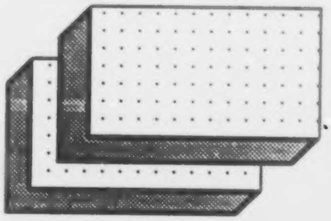
I feel that this content based curriculum is also premised on a dubious view of human learning. U.S. educators often pointed out to me that higher order intellectual skills were completely out of reach until students had mastered the basics. Without a solid foundation of facts and concepts, problem solving thinking was impossible. I suspect this has something to do with the patronising view of intelligence promoted by the teachings of Piaget. Evidence from every subject in U.K. schools from math and science through to history and English suggests that most students can master higher order skills if the curriculum is planned around them, and if teachers place them at the forefront of their priorities. Perhaps most importantly, the sheer challenge of the process dominated curriculum fosters a spirit of professional co-operation and raises expectations of what students are capable of.

SQUASH IT YOURSELF

Laura Hoeke

I spent a good deal of time in Rachel Jones' Junior class at Lynncroft school. In her class I found the students actively involved with their lessons and learning. I attribute part of this to her genuine interest and enthusiasm in the students and their work. I was first introduced to her class in "the quiet room", a small room connected to the classroom where the children and teacher met for group activities, in this case an organizational meeting. They were discussing the morning's activities and the children were showing some of their finished products. Two children had finished writing and illustrating a book, one child had finished another project, and three boys had finished building items with Lego blocks. She paid special attention to each child as they spoke, as did the children. When a child needed to dig deeper into their activity she pointed this out and suggested an extension to that activity.

One child's Lego construction caught her eye. William had built a block solely out of the green, flat, rectangular blocks leaving the edge colemn and edge row uncovered.

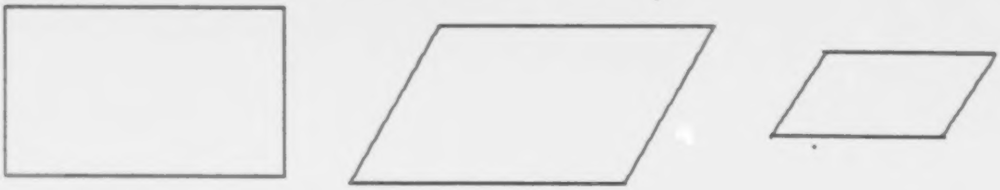


He had constructed a 3-dimensional parallelogram. Rachel was very interested in this construction and spent some extra time discussing the finer qualities and shapes with the students. This suprised me because my initial reaction would have been -- "That's nice!?" -- and let it go at that. Instead she pointed out the rectangles and rhombi found in the block. Then she had the children tell what the figure would have been if she unsquashed it -- a 3-dimensional rectangle. At this point she handed the block back to William and concluded their organizational meeting.

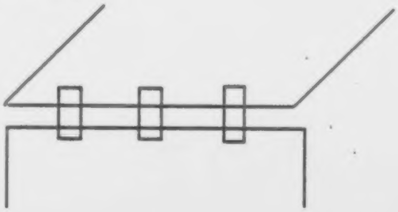
I was intrigued: Why had she shown so much interest in a block -- granted the block held many identifiable shapes and in itself was an interesting figure, but why all the fuss! Besides how much could be learned by playing with Legos? The ancient wall of doubt loomed above me. Could this be teaching or was it just glorified play?

Something told me that, yes, this was very important, even though I did not understand what it was. So I asked William after the meeting if we could build the block with some other materials. He suggested paper and off we went. (I don't know exactly what he gained from the experience but I learned a ton!!)

William gathered together some scrap paper and we drew and cut out two rectangles, two small rhombi, and two large rhombi using the block he had built as the master design.



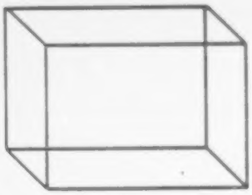
We had cut these to the exact size of the cube, leaving no room for pasting them together. I asked William how he planned on connecting the shapes together. He immediately tore some strips of scrap paper and glued those strips to two connecting shapes to hold them together. (This activity turned out to be extremely valuable. The technique William had used to attach the paper together was a technique the class had used a month before. Rachel was suprised to see it in his work because there is normally a ten month span between the introduction of an idea and its incorporation in the child's activity.)



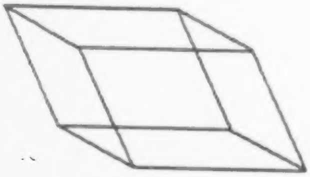
As we continued working on our construction it began to sag and buckle because of the weight of the glue and the relative flimsiness of the paper. As this point William suggested building a frame to support the paper. I agreed with the idea and he ran off to get some art straws. We attached these to the construction using the same method. Our finished product was an ugly, squashed, and buckled form which vaguely resembled the original form. Both William and I thought it could use some help, but did no more work on it. We did discuss what could be done to make it look nicer -- cardboard would have definitly worked better, and we talked about different methods of connecting the art straws together.

William showed Rachel the construction. She said we had done a fine job with it. My inital reaction was "How was it a fine job -- it sagged and looked ugly!" However, in thinking the activity over I am discovering the real value techniques in building the 3-D Rhombus, and there was certainly nothing half-way in the quality of William's thinking as we built the project. We simply used the wrong materials. I don't think that I will ever look at a final product, no matter how sloppy, without looking for the quality of thought that went into it. The fact that it appears shoddy does not mean the thinking was -- it might have been the materials or some other uncontrollable feature of the project.

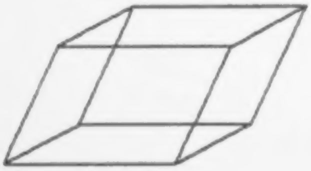
As an addendum to this article, you will notice that I never drew the complete figure. This is for an excellent reason -- It's an impossible task!! I started off by drawing a simple rectangular box on paper.



Then I squashed it in one direction.



That was simple enough, BUT if I tried to squash the second time -- to match ther construction I arrived at another rectangular box or one that was slightly squashed. Does anyone know why this is an impossible task? I spent two frustrating days doing this and I still don't understand why its impossible but I accept it as a fact for the moment.



If you really would like to see the object William built I suggest that you find some of the flat green Lego's and build it yourself.

BRITISH IDEAS THAT CAN WORK FOR U.S.

Jeanne L. Wright

I had the opportunity to visit England in order to observe the classroom situation inside their schools. I felt as if I were transported to a make-believe world where children were in love with learning. The atmosphere in the classroom was filled with a combination of merriment, laughter, and seriousness. I came back to the reality of my own classroom and decided that I wanted the same situation. The following are some of the changes I made to incorporate this feeling into my own classroom.

The first approach I wanted to concentrate on was to expand my curriculum. I noticed students did not use textbooks, nor did the teachers use teacher's manuals. The entire curriculum was developed by the teachers themselves. The teachers used various resource materials to create their own lesson plans. Chiefly, I saw that the teachers chose a theme and developed all the subjects around this theme. I found this could work for me since it is difficult to find one teacher's manual to fully reach the needs of all my students. Basically, I found there was too much repetition in areas the children were competent in and not enough practice in areas of weakness. So I focused on expanding my lesson plans.

The first step I took was to go through all my subjects and pick out areas where the students needed reinforcement and areas where they needed enrichment. Mainly, I wanted to do some integrating of the subjects. For example, we study the solar system in my third grade class. I decided to expand the unit by having the children create a display on the subject. The display consisted of student made spaceships, telescopes, creatures, satellites, etc. We also integrated this subject into our handwriting and creative writing. The students were given challenge words consisting of words from the unit. Over a period of several weeks we wrote various stories. One such creative writing experience was abstract questions such as: "Where is the end of the world?" or "When will you travel in space?." When we visited the library, we searched for books containing any information pertaining to our solar system. I placed books in the learning centers and other areas of the room for the children to read. I also read some of the books to them at reading time. We used our math skills to calculate our weight on the moon. In third grade social studies, we study the community. To integrate the concept of communities in the solar system, we had discussions about what a community would be like on the moon. We broke into small groups and drew a map of what a community would need to consist of to survive on the moon.

The second approach I took was to give my students the opportunity to read. Books, books, and more books are everywhere. Even though there are no so-called text books to be found, there are an abundance of books for reading and research. I stocked my bookshelves and placed books all over my room in learning centers, chalk board tray, window sills, and any other available open space. Now that I have all these books I did the next logical thing. The British school I visited always starts the day with everyone reading. So, for the first fifteen minutes of each and every day, we read. One British teacher informed me that this reading time is used for two purposes. To give the students time to read without interruptions and to calm down the students before beginning the day.

Another idea I incorporated into my classroom was that of the students reading orally with a parent at home. I require that each student read for fifteen minutes a week or a total of sixty minutes for the month. The parents send back a signed note stating the time and excerpt read. I then record it on a classroom chart.

In addition, I make sure I read to my students everyday. Before this I would read occasionally, but this year I make it a top priority. The students look forward to it and even bring books from home for me to read.

The third area I wanted to concentrate on was the over all attitude of the classroom. I noticed as I walked around the British schools that it was quiet and the children were busy working on various projects. When the teacher spoke to the children she never raised her voice to get their attention. As a matter of fact she was so soft spoken that it was natural for the children to quiet themselves down to hear her.

I also realized that the teachers in the British schools seldom met with the class as a whole. The class would talk together first thing in the morning to discuss the activities of the day and then they would go to the group they were to be involved in for the day. The rest of the days focus was placed on the individual students. The teacher was always helping small groups or individuals.

I did observe the teacher meeting with the whole class one afternoon. There seemed to have been a problem at recess time. The whole class was presented the situation and then they discussed a logical solution to the problem. I used this technique in my classroom and I found the students are really quite helpful with ways to avoid the problem in the future.

All of the above may not always work in your classroom, just like every approach will not always work for all students. One British teacher expressed it by the following: "Focus on the individual, do what works for the majority."

A SECOND CONVERSATION WITH PHILIP WOOD

Barbara Goldenhersh

Philip Wood is head teacher at the Dalton-Foljambe school in Rotherham, England. The school is a marvelous one in which learning takes place to the fullest. Never have I seen such caring amongst staff and students, nor such excellence in all aspects of educating children. You can read a good deal more about this excellent school and Philip Wood in **SEEDBED 24**. It is eye-opening, and I hope you will do so. I first saw this school in 1985 and returned two years later to find the excellence at least as high, if not higher.

During this interview, there were numerous interruptions. Parents came to the door to ask about their child, tell the head teacher why their child was not there, turn in money from the pub crawl that had just been held, and even to cry on Philip's shoulder as an older son of one of the parents has been diagnosed as having a serious illness. Students also stopped in for various reasons, to share a picture or story they had completed, to ask a question, or just for a chat. In each instance, Philip spent the time necessary to deal with each in a positive way. No one was asked to wait, nor was anyone rushed or treated with less than his fullest attention. Although the door to his office was closed to block out noise during the interview, it was apparently quite acceptable for the door to be opened after a short knock. He was totally accessible to all who needed him.

Following is a description of the catchment area (local school area) as described by Head Teacher Philip Wood. This description is taken from his 1985 interview and repeated here so you can understand some of what is said in the context of the background from which the children come.

> *The 260 children (aged 3 - 11) come almost exclusively from five streets (four of them cul-de-sacs) running parallel, each ending at a very busy main road taking traffic from Rotherham to Doncaster. Some children also live on this main road. The housing is terraced and cramped. The houses are small and most have two or three bedrooms. Each house has a yard at the back and a minute piece of land at the front. The houses are about eighty years old and are owned largely by the local council, to which the tenants pay rent. There has been a massive improvement scheme taken place on the houses but to visit the streets is to question the use of the money. Streets are strewn with bricks, glass and excrement; dogs roam the paths. Some houses are empty and have been boarded up after windows have been broken. Many such properties have been broken into and had fittings stolen.*
>
> *Within this area:*
> *1) over 50% are one parent families.*
> *2) over 70% have no adult in full-time employment.*
> *3) about 90% of teenagers leaving school have no job.*
> *4) nearly 80% of the children have a free school lunch.*
> *5) Dalton has the cheapest rents in Rotherham.*

Barbara Goldenhersh:
What I would like to understand is the underpinnings of this school. What makes it run the way it does? This is not what we would expect to see from children who have such limited background. Somewhere along the line you're instilling something in these children. The aggression they probably live with is not brought into the school. You are developing an interest in learning that's certainly not coming from the home and a caring about school and life and being somebody that doesn't seem to be borne out by much of what their life would show them or what their future really holds if the unemployment remains as bad as it is now.

I find it fascinating that these children overcome so much more than I see in other place. So what did you do? What is your secret?

Philip Wood:
I think that there are many factors to what you see. You could come on a day where you would think everything was absolutely perfect. You have occasional days like that. You could come on another day like today and see all sorts of odds and ends that say, "Oh, yes, that's a problem." But I think what you would **not** largely see is the children being obviously very offensive and badly behaved in classrooms. You would **not** see vast evidence of children being very badly behaved around the school building. You'll see it, but not terribly. You will not often see very aggressive behavior out on the playground. Having said that, I think these children have a tremendous potential for the aggression and disruption I see in many of their parents. I see it in the way the parents deal with each other, the way they deal with their children, which can be very aggressive indeed, and I see it child to child. I think it's there to the degree that this time last year I wrote to our director to acknowledge what I saw as a tremendous aggressive feeling amongst people who populate this school.

Yet, largely it doesn't appear, which is not to say it didn't. In my first year here, perhaps 18 months, it would seem that regularly, after play times and dinner times, I had children brought to me because they had been fighting, kicking, falling out, trying to run home, etc. I had some, but not many, annoyed parents because staff were being very aggressive to children, and they were unhappy with the way that children were being dealt with in school.

So it's not something that altered overnight. It is something that is altering today, and I hope next year will be better than this year has been as I think this year has been largely better than last year was. But I think first and foremost it is an attitude of mind that you build up in school. It has to take a long time because you actually have to permeate the minds of the children. What you need to do is cause them to feel that the school is a reasonable place to be, that they actually don't mind coming, that they can feel an affinity for the adults who are in the school, who take an interest in them as human beings and who share the day with them. And that might be at half past 8:00 through play time, at lunch time, after school, whenever.

If any of this tends to suggest that the whole thing is a sort of trashy love affair where everything is always very sweet and sickly, it's not so. Just as at home, if my daughter is doing something I don't want her to do, I shall have words with her. It's how I have the words that is important, but expect me to have them, for this is how they know and it's important that the children know what they can and can't do, what's acceptable, what's unacceptable and why. I hope that being aware of what's unacceptable, they are eight times out of ten not going to do it. And when the ninth comes along, we're going to talk about it, about why it was done and the consequences are not going to be dreadfully severe. Thus, severe punishment as such is going to be a relatively rare thing, but it nevertheless needs to exist. It needs to be there, and for the odd child who might want to push things along as far as you can go, it is, I think, essential, in the end, that he actually realize that there will be sanctions about it. But I think you can get round a huge percentage of problems just out of a positive approach to children.

As far as the work they're going to do, it is imperative that the adults here are warm to the children, try to understand them, and care about them. If we can push that attitude into children, then they'll approach each other that way, and that's difficult, because children are basically fairly selfish. To get them to realize that there's a society here and we need to share, cooperate, work together, and help each other has to be something that you always preach. You might be preaching it without saying it,because it might be an underlying part of something you're doing one day, but it's always there. It's always the approach that is generated, and the staff will support that.

Next you come to the work that's being done. If the work they're doing gives scope for children to express what they do, if it's about things they can understand, things that are relevant to them and their experiences, then, perhaps, they'll be interested enough to have a go at it. If the teacher's approach to what is being done by the children is one where they're using things set to find out what children can do in reading and writing and numbers and science and so on, if they're then actually using what they can do to take them into areas they're going to develop, then the children are going to receive encouragement, support, and obvious teacher affection for what they're doing. It's going to be shown in the presentation of the work and the way the school accepts what is done. Then, hopefully, it's going to develop within the children enough of a positive attitude to want to be there, to say, "Look what I can do, come and see this," and so on. This enthusiasm, I believe, sets to one side an awful lot of possible disruptive behavior, because they're involved so positively in things they actually are doing that the chances for aggression, disruption and so on are minimized.

I think within that there needs to be a good structure, a good organization among staff for what children are doing, how they're doing it, where they're getting stuff from, what they do when they finish something, and just how the classroom is run. I feel it's one of those things which, the better it is done, the more anybody looking at it thinks they could do it, because it looks so simple and it belies the tremendous logistical difficulties there are in organizing 30 kids to do perhaps four or five different things at a certain time at different levels. Then again, it gives children scope for misdemeanor, which is not a good thing. It is important, I think, that we push thinking and sharing together, and that we do a lot of things that are about children working together and sharing experiences cooperatively.

We just held a sponsored walk and it was wonderful to see them laugh spontaneously. Quite a number of our oldest children were walking with the younger ones, holding hands and walking them around. Sometimes brothers and sisters, sometimes just people they knew. You see a community atmosphere being created. This is what you want but this wasn't here when I came. The oldest children didn't want to know about the youngest children, the youngest children didn't know where the oldest children were. The more you can sort of link it to family the better.

Add into that the parents. Though that has been difficult here, I see it as something that's going well. I think where you can pull parents in to get involved in the school, they get involved in finding out what their children are doing, and to share the realization that the place is actually on the children's side and therefore on the parent's side.

Let me tell you about the pub crawl. Although we are the only school in Rotherham to have one and though it seems strange, it is not illegal. The parents have just had their third annual pub crawl and raised 212 pounds. It's their idea, not mine, and it grew. It keeps growing and out they went Friday night to the pubs around town for the school and raised all that money. And that interest permeates the children's world, and you hope it becomes a family thing and it makes it easier for parents to come and talk to me about things that concern them,and they realize that we are trying to share the children with them.

Hopefully all this builds up to keeping from happening the sort of thing a fellow from an authority to the east of here was asking me about yesterday. He asked, "Where do you put your most disruptive children and what policy have you got for the children you can't control?" But it doesn't happen, it just doesn't happen.

The only really difficult control problems I've got are with two or three of my youngest infant children (age 5) whose general modes of behavior at home and out at play are very violent ones. When they come here they want to carry on in the same way. Even after talking to them about what they're doing and why they shouldn't do it, within a short space of time they're so wrapped up in their playing they're back to doing it again. But the point is, if your little five-year-old daughter is on the receiving end of this, then you come to my room and express your displeasure, and I understand. So as head of the staff I can look and say, "What am I going to do with these two or three?" At the moment I've one lad, John (name changed), for whom I can only see negative answers. The thing I'm looking to is David (name changed), now in middle infant (age 7). When he was in nursery, he was our biggest behavior problem and continued to be so as he came into reception and middle infant and so he was often with me at lunchtime because the dinner ladies couldn't handle him. These last six months he's been so much better. I guess it's the football. If you'd tell him he could play football all day long he'd be the happiest child in all the world. But he hardly appears in front of me for his mild indiscretions anymore. That's what cheers me up about John at the moment, because I see no sort of end to this lad at all. And, yet, looking back at David when he was John's age, I have hope. David is now, from the point of view of behavior, tremendous, so perhaps in a few months time we shall begin to come to grips with John because in actual fact, when you sit with John as I did at lunchtime, he chats along cheerily. He wants to talk with Mr. Wood and ask about this, that, and the other. You think, "personable young lad here," but you get him outside and he's very aggressive indeed.

So I hope his behavior will improve, and yet you could so easily go overboard in terms of punishing someone for bad behavior that you leave yourself nowhere to go. You don't look at the why but just sort of fury and frustrate over the problem.

Now one of the interesting things is that beginning August 15th, corporal punishment of any description is banned by law in this country. Now, at the moment it is not, and different educational authorities have or have not banned corporal punishment from their schools as they wished. Rotherham never has, so, if I was to cane people at the moment, I could. And I don't assume that there's a boy here for whom it's never crossed my mind. Having said that, the opportunity to smack a child is there and it is something one can do, though not something I've done for a very long time. But one or two of my staff still do occasionally. Now, again I would put to you, as I said early this afternoon, that is another of the reasons why my old reception teacher is thinking of leaving. She is my main culprit in that way. I was talking to my staff only last week. They feel next year could be, from a discipline point of view, very difficult because the sanction is no longer there. Yet very few of them use the sanctions. Only one of them uses it with any sort of regularity, and she's going to retire. They seem to think that something magical is going to happen to these kids and they are going to change. Now I don't see it. I think they are over-estimating this by a massive distance. But the way they are going to find this out is not by surmising about it but only after they actually get around to doing it. And I think next year at this time they are going to look back and say, "What were we worried about?" They fail to see that what we are doing with children will cause the problem not to occur. So, we shall see.

This is basically about the attitude of mind we set. It's about the sort of atmosphere of the place that you create. It's about the work you set up. It's about the approach of the adults to the children. The way you try and develop a community spirit. The way the place becomes a part of the children that the reason they are here, the reason we are here is for their work and that's what the whole place is about. When you get that going on and enough thriving activity, it's bound to make it a busy working place and so a lot of the troublesome things that could happen, and I'm certain that these kids have that potential, don't.

Then I think you try to be as fair, as kind, and as understanding as possible. But I also think that, as in any decent home, it's important that children know what they can and can't do and that they know that if they intentionally do something they shouldn't have done, they are not going to be patted on the head and asked to do it again. Somebody's going to at least say, "Oh come on. You know why." And then one might say, "Go away and don't do it again." I think you've got to judge your children very individually. Sometimes, with some characters, rather than talk to them, it's more important for them to talk to me for some of the things they do are for reasons that aren't immediately apparent.

There's one boy who demands attention all the time. He has a whole series of ways of demanding this attention. But he has a very sad life. He has no friends, no one wants to know about Thomas (name changed). His Mother isn't great and he has no Dad. It's one thing understanding all that and another thing when you have him in your class. You want to do things and he goes on and on and you want him to be quiet. I'm trying, at the moment, to get him to realize what he's like because in a year's time he's going to comprehensive school and if he tries that there, they will just forget that corporal punishment has been banned and exercise it upon him because that's the way they look at it. And in actual fact he is quite bright and in many ways he is quite enthusiastic about work. But I can imagine that if his behavior is there as it is here sometimes, he is going to refuse to go.

In the middle classroom, there is a boy who has cerebral palsy. It affects his face and children tend to be unkind to him and he has no friends either. He too can do some quite strange things. Instead of talking to him all the time, you get him to talk to you. Then he'll talk to me about his life. He absolutely fascinates me. He is one of five children, the oldest girl is about 14. She has done six months secondary schooling in three years and that's it. She doesn't go any more. He is the only lad. Mom's a hard lady. I gather she delivered one of the children herself on the bathroom floor. Dad is a regular prison visitor and is often not around. It is an aggressive home., one of those where, if things aren't right, it's "hit somebody". This lad has a bedroom in the attic and he has a television set which is his best friend. I gather it cost 6 pounds, they got it second hand. Generally speaking, he goes home, goes up to his room, switches the television on and watches television until he goes to sleep. He likes the weekend because the late films are on and there are two channels which run these films until 3:30 in the morning. He tells me he watches them as much as he can. And that's the extent of his life.

He doesn't go out, he doesn't have friends, and he says the girls (his sisters) just argue and make him mad. So that's what he does. It's what he'll do tonight and what he'll do tomorrow and what he did last night. And occasionally he does odd things and I can understand. But it's not good when he perpetrates the odd things on other people because other people don't appreciate it.

Barbara Goldenhersh:
You show a level of understanding much deeper than the surface of the child. And I think it's an important facet in what you do. You see beyond the immediate action, and beyond the behavior of the day.

Philip Wood:
It's always worth working out the reason before you go much further. I think it's one of the things I've learned, and I've only learned it by bitter experience. But, no matter what it is that's happening, there's always a reason for it. Sometimes the reason might justifiably mean that you are going to express yourself unhappily to somebody. Sometimes it absolutely doesn't. I think, having been here some time and knowing families, is a great help. And also, the more you get to know children and the deeper the relationship you build up gives you the license sometimes to be able not to do much about something that somebody else looking coldly from the outside might think you ought to do an awful lot about. Because knowing the situation, the child, the time, the circumstance, it is sometimes reasonable to talk and then leave it thus appealing to their conscience, their soul. They are upset at letting you down. This you can't do when you first come because there isn't anything on which to base that.

I'm not here five years yet and I feel this school is very much mine. It is very different from what it was when I came, when it wasn't mine. It now has me stamped on it. Whether it is good, whether it is bad, or more likely, when it drops in between somewhere, it is actually mine, it has my imprint on it. It is an arrogant sort of feeling. I certainly wouldn't want to go to another school and start again. That was the hardest thing I've ever done in my life, establish this headship. It certainly is easier today in many ways than it was in the first year. In other ways, it is harder. But those ways are of my making and they are positive ways of being harder. When I first started it was just hard.

In this job there are all sorts of satisfaction. I can look at that piece of writing you have there. When I first came here, there was no one in our top class who produced a piece of writing of that quality. This was the first time written. It was faultless, it went on for a page and a half. It was done in pencil, it was most legible, and most of all she had listened to what I had asked and she'd done it perfectly, and what you've got was a very individual piece of writing about how our sponsored walk had effected her and what she thought about it and she captured all that and she quietly sat down until she'd done it. Five years ago I'd have had to really made them sit down and do it. After eight lines they'd have had enough and they wouldn't have been nearly as accurate as she was.

Barbara Goldenhersh:
The math is fascinating. You are using the manipulatives we talk about as being important and it is certainly working. The lesson I observed you present to nine-year-olds was exciting and intriguing to the kids and reached so many levels.

Philip Wood:
I think what was interesting to me was the fact that since I was talking very generally, I was floating from one idea to another, one aspect of maths to another, one type of concept to another, and they were following me, most of them, and within it they were having to use quite a lot of mathematical words. They needed to know the difference between a cube and a square, what faces and edges were, to use vertices, to be able to talk about quadrilateral and trapezium and be able to recognize these things. They talked about horizontal and vertical. They talked about odd and even, between and less than, all sorts of mathematical phrases that they handled without any problem at all, which was very good. One or two of the "verticals" and "horizontals" were coming from the less able children in the class. They really have got hold of that pretty well and they enjoy the language. They have achieved a fairly wide grounding which is nice and will develop next year.

We've got a really good teacher for next year who has done some great things with maths this year, and I know she will build on her work of the last two years. She's got a good base on which to work.

Just looking at staff and perception fascinates me. There are some who are so perceptive it frightens me, but there are others who haven't gotten the perception of that radiator. We can't do much about that. It's not easy to shovel in perception where it isn't. For example, we had this sponsored walk and, as I've said, we had a great morning. The children were super, parents walk as well, enjoying a real sharing occasion. Lunchtime is the most peaceful lunchtime of the year, as the children were hot and tired. Come the afternoon which may not be the best working time, I'm interested in whether anyone wanted to make use of all that we did in their classroom.

In reception classes (age 5), one teacher used it as a writing experience and centered about that -- great. So far as I can see, the teacher next door didn't bring it in her thinking at all. A middle infant (age 7) lady did a great big picture of it with hundreds of kids walking, so they used it. I used it with the first year juniors (age 8) for writing. The teacher was away and so they did that with me. What I wanted to do was get a very personalized piece of writing. I wanted them to look at the sponsored walk. I didn't want just a general description, I wanted their sponsored walk. I got through to some and not to others, but never mind. In third year junior she got it all organized before the event began. She decided it would be a great problem solving maths chance and she came up with heaps of things she wanted to find out. I wondered why, in the afternoon, children were wandering around with tape measures and things like that. They had to work in massive figures, get calculators out. They did an absolutely wonderful job and the materials are just appearing on the walls now. They are terrific.

There were four staff who haven't used it at all. Now I'm quite prepared to settle for one lad who is a hell of a teacher and highly organized. I would put money on it that he said, "No, I don't want to do that. I'm busy doing this. I'm too busy," and will actually have thought about it. Then I have two others certainly for whom it would not have crossed their mind. It could have been a tremendous chance for whatever you wanted to work on in your class at the time. You might be concerned to develop writing, maths, art, models, talking, whatever. A very direct experience that all the children have had. It comes down to perception. Some people seize a great chance. Some people have seen a chance and don't want to take it. Some haven't seen the chance. Just give me perceptive people and I'll settle for that. I've got some, which is great, but not all of them.

Barbara Goldenhersh:
I would think the large amount of materials you put up in the hallways, would feed ideas to the others.

Philip Wood:
Undoubtedly that's what happens. But what interests me, in that there are some who don't do it, is what would happen if, for two terms, I weren't here and they just ran on. I think it would be very interesting, but I suspect I don't want to know. There are some staff for whom you have to feed and I feel that if I were not there with what seems to me a bicycle pump, pumping it in, then it would grind to a halt, and that is when I see how effective I am being. But the realistic side of this says you can't expect more than that and if you weren't doing that there would be nothing at all.

On the other hand, there is some staff who do think, and I feel that's brilliant. What are we going to talk about? She doesn't need me. I have to try and think of something to say because I'm supposed to. At lunchtime I discovered that two members of the staff are developing an initiative on calculators with infants (age six) at the moment. They hadn't been to me at all, but they got together and talked and decided on some things they are going to have a go at and she just said, "We are going to need a few more calculators if you can do that." No problem. Tremendous!

I wish all areas were like that but I suppose, strictly thinking, I can't have that. If I may use the analogy, when I came the first day I could see them all at the starting post. It was like a horse race. They were ready to start -- on your mark, get set, go. But in any horse race, they aren't going to arrive at the finish line at the same time. There are some that are so fast. They are the best race horses you can imagine. There are some that are improving all the way. There are some really good stayers who are not going to win but they're going to be okay. And I've got a couple who lie comparatively so far away in the distance that I wonder when they are going to get there. It's spread out like that now. It's an interesting question where you put your time, how you deal with the people. Realistically, the ones who are flying on are the ones you can talk to most easily. The ones who are up there perhaps have some ways of it and might not want you to probe too deeply and have nice ways of pushing you away. And then you throw in all the other things in life that happen in this place that take me away from staff. And perhaps if you don't want Mr. Wood around you too much it's possible for it to happen. But I gather that's what they pay me for more than anything else. So it's an interesting conundrum. I haven't solved it, but I try.

Barbara Goldenhersh:
The amount you, as a head teacher, put in the classroom fascinates me. You don't see that in the states. You are going into classrooms taking portions of classes or whole classes, teaching classes in various subject areas, getting your hands into the teaching.

Philip Wood:
It varies. This week I taught all Monday afternoon. I had visitors yesterday morning. Was out with the nursery (age 4) in the afternoon. I've taught part of today. I'm out with the nursery again all tomorrow. I've a teaching commitment Friday morning and another Friday afternoon. So by the time this week is done, I'll have spent more than two days teaching. Some weeks I can beat that, other weeks I don't do that. It varies. But it's important to be there as often as possible for lots of reasons.

Barbara Goldenhersh:
And what you do isn't necessarily based on what the class is doing. It is based on what you want to bring into it. Is that correct?

Philip Wood:
It varies. I used to go in with all sorts of malice aforethought and reasons for doing which, generally, I was honest to the teachers about, but not always. These days it's different. Often I was looking at basic philosophies that I felt we ought to get hold of that we hadn't even really started. So I was very careful about what I was doing when I was in classrooms. Nowadays it's much nicer because I can either support a teacher with what she is doing or I can just do something I'm interested in and want to do. Knowing the general thrust of the work that I want to see is going on anyway I have more freedom.

In the math you observed, I'm working with Val on a once a week basis with some of the pegboards and she follows up through the week. But when I'm covering her recorders (*note: Wood teaches part of the group so the teacher can teach a group of interested children the recorder, B.G*), I do back up number work just to enjoy and reinforce things that she's been doing. Things she thinks they understand.

With the writers, that's slightly different. That was done for a different reason. It still is. I have to say I enjoy it. It's something I'm doing that I much prefer. I enjoy language more than anything. Seeing children creating words so they come alive I think is marvelous. I had said to you when I came, of all the curriculum areas that were bad, the writing here was appalling. It was short, banal, scruffily produced. Nobody actually wanted to do it or read it. There was nothing to be gained on anybody's behalf in doing it or reading it. They had to go to the comprehensive school and write when they left there. In every other curriculum area there were some positive things, but in writing I couldn't see any.

And to look at how that has changed is one of the most interesting things. I caught myself saying recently what a great group of writers we have at school. And I realized how bad it had been. And I got to saying, "Why isn't it awful anymore? Why is it so much better?" We got over that. We tilted that balance without my realizing that we had tilted it. Another of those things I was not worrying about. I was now looking at the writing that we've got and how we take the kids into other areas.

And this is one of the reasons why I work with this particular group. Because the teacher who has them limits himself very much as to what he works on, and I try to get him to develop his work in writing. But he finds it hard, so I'm happy to work with the kids and then share with him what we've done and ask him to have a go at similar sorts of things. The kids enjoy the challenge of being asked to put words on paper in ways that are slightly different from what we've been asked before. Ways that give them slightly different opportunities to open up new avenues, that give them certain freedom to create things of their own. And as long as their attitude is right, their responsibility and self reliance is okay, they are actually going to get into it. There are all sorts of things they can achieve.

And so that's why we do that -- and we do that every Wednesday morning. We meet on Tuesday afternoon and talk about what I want them to write about so they can think about it and organize. I never introduce a piece of writing and expect them to start. I think that's asking a lot. I'd rather give them time to think about it.

Barbara Goldenhersh:
The home environment isn't encouraging this creativity. What is the parents' response to it? Have they grown with it?

Philip Wood:
I haven't got a good answer for you. The parents generally cannot assess well what their children are doing. Their main criterion about their children in this school is whether their child is happy. That's what they are most concerned about. It's less to do with how they're doing in reading, writing, maths. Still after almost five years, it's fair to say that the number of people who've sat where you're sitting who've come to talk about an aspect of their child's work you could count on the fingers of that hand. It just doesn't come into their way of thinking. As long as their children are reasonably happy, like their teacher and are well looked after, they are not going to question. They're not going to understand why, so they settle for it. When we had our first open house when I first came the classes averaged five parents per class of 25, and we are now up to 75%. But I feel they come because their kids want them to, and secondly because they know we won't bite. They tend to sit and listen to the teacher and don't ask questions. What they are going to talk about is behavior, what they're like at home, what their brothers and sisters are like.

Now I have to say, in this day and age, in this educational climate that's great. There are some schools that have parents asking to see huge amounts of work. And I don't have to deal with that. My parents say, "So and so is fighting so and so on the way home. What are you going to do about it," "They got pushed down on the playground and I don't think it's right?"

That's what they are going to talk about. That and, "My husband's battering me," "I think my husband is going to leave me," "I think my son has multiple sclerosis," etc., etc.

Barbara Goldenhersh:
The artistic ability that I see brought out, the power of observation is amazing here.

Philip Wood:
There are a number of Rotherham schools where the power of observation is unbelievable. It makes you gasp. I think if it's something on which you work on from nursery onwards, and you've had children work on it for seven years, and it still looks like the drawn work that I saw when I first came here then there is something horribly wrong somewhere. They went somewhere on a bus so they all drew a bus, the teacher read a book so they all drew a picture about the book.

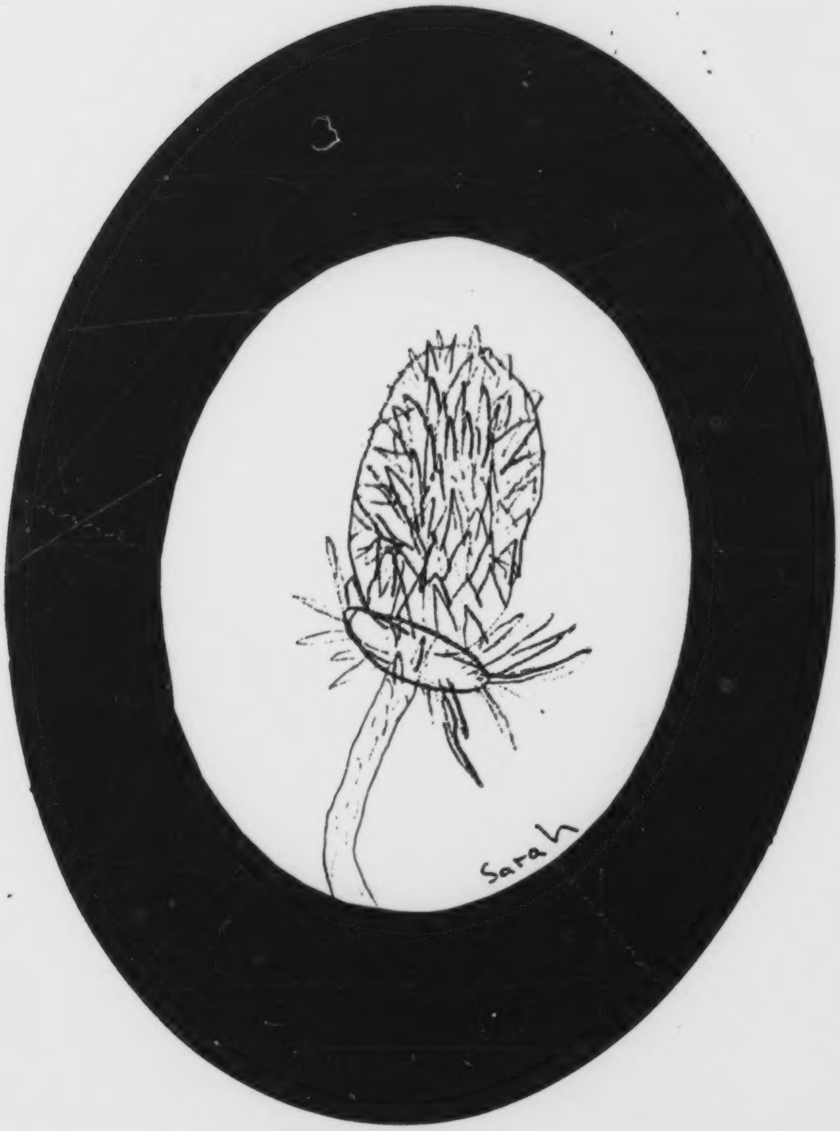
What have I read lately? It was a great book, but if someone asked me to draw a picture of a scene from that book, the result would be horrific beyond compare. I couldn't do it, Yet they were saying to eight-year-olds who had just read, say, **Charlie and the Chocolate Factory**, "Let's paint a picture of the chocolate factory. So they were painting people and buildings and so on but how can you do it unless you do it by looking at people and buildings. How do you know what a child can do unless you can base it on something so you have some idea of what's on their mind. Trying to talk to staff about that when I first came was difficult. If you say, "Paint me a picture of the man from Saturn," then anything you put on paper is right because that's their man from Saturn. If you say, "Paint a picture of this spider plant," it's there for them to see and they can learn to observe, to be aware of shapes, of perspective, of how it actually looks. And you can see improvement. And with the addition of various media, the child can determine what would best suit their vision. Many children will try one media and follow that with the same thing done in another media as we saw in the displays in the hallways and classrooms.

> *Philip Wood went on to talk about his school with a love and a caring I have seen nowhere else. Unfortunately we were out of tape and then out of time. I hope to continue picking the brain of Philip on subsequent visits for he has so much to offer.*

CREATIVITY AT DALTON-FOLJAMBE

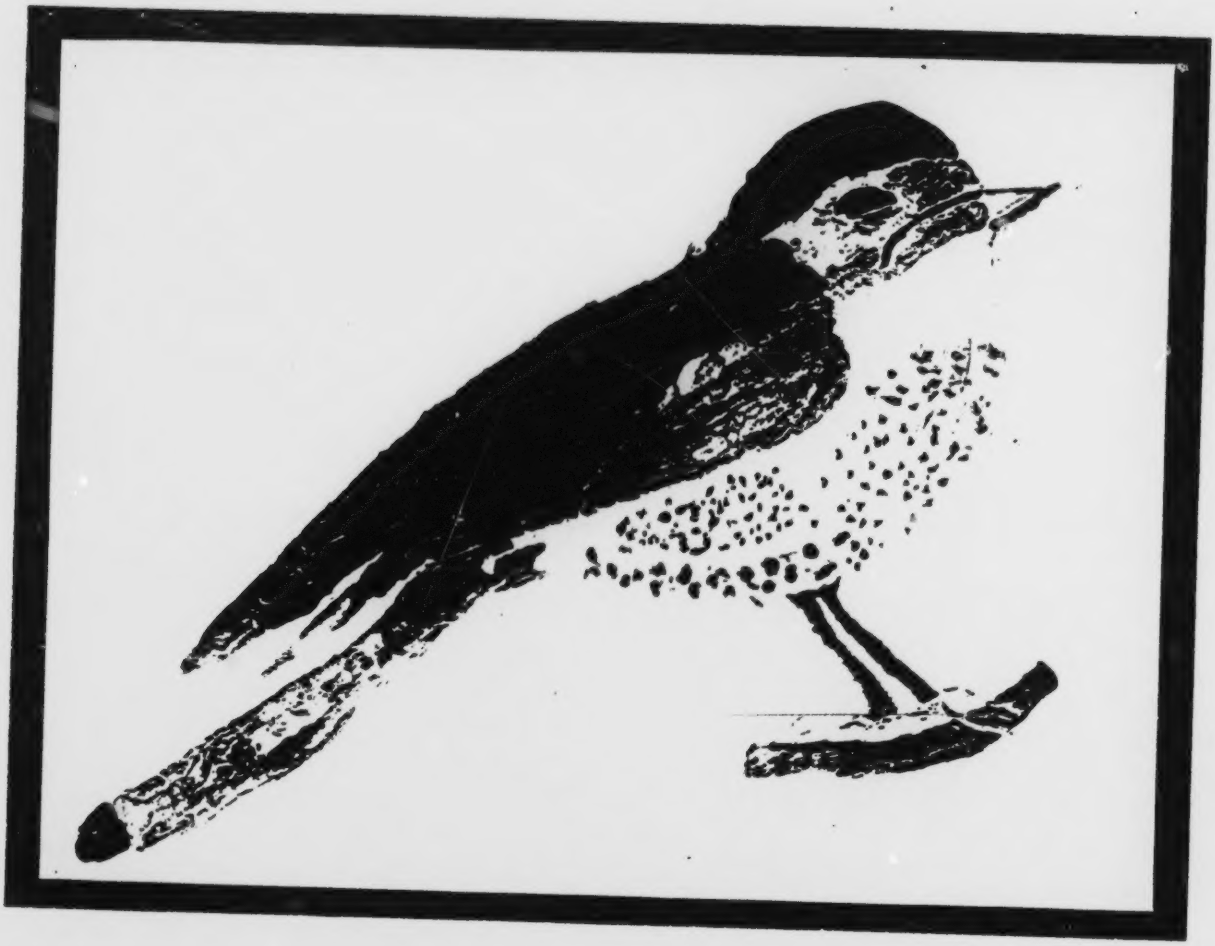
The cover of **SEEDBED 31** and following section of artwork and creative writing were done by children aged 7-10 at Dalton-Foljambe School, Rotherham, England (see **A Second Conversation With Phillip Wood** for details of this amazing school). This is by no means the best of the creative work which festoons the walls, ceilings, tables, classrooms, and hallways of this incredible school, but what was available to the head teacher as the end of term drew near.

--Barb Goldenhersh

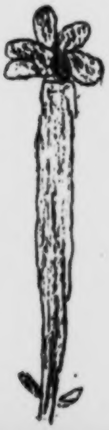

Sarah

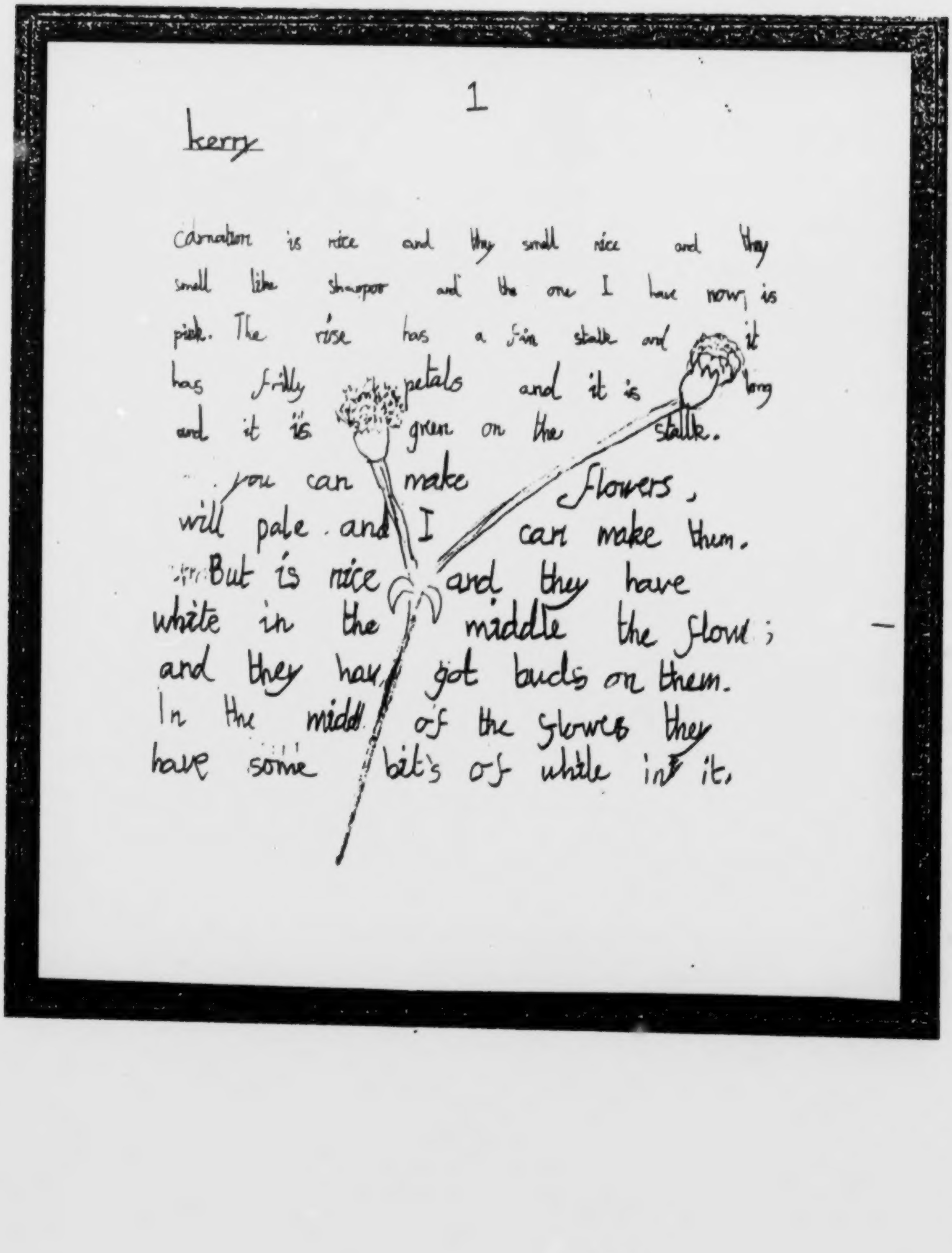
A Robin.

A Robin came to our tree.
Round fat red breast.
Hungry looking for food
He spotted the bird cake
Trying to get the bird cake
He fluttered for a second
Trying to balance on the string
He was not as good as the blue tit
Flapping his wings each time
He pecked a little piece
And flew to the branch
He is not a acrobat like the blue tit.



I coloured a picture
of a purple crocus.
It has some skin up
the stalk. It has
six petals They have
lots of little lines
up them. They have
yellow bits inside.

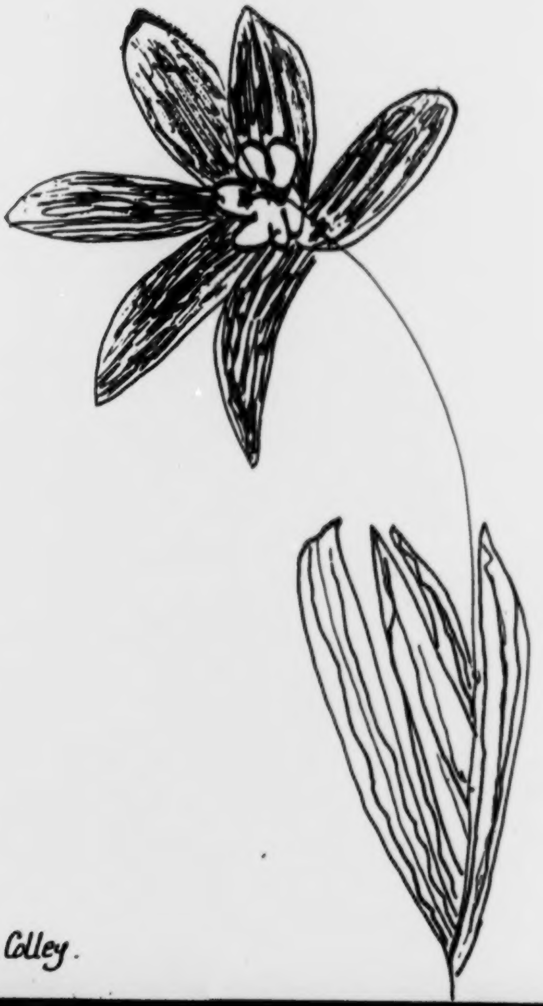




1

kerry

carnation is nice and they small nice and they
small like shampoo and the one I have now is
pink. The rise has a fin stalk and it
has frilly petals and it is long
and it is green on the stalk.
you can make flowers,
will pale and I can make them.
But is nice and they have
white in the middle the flowe;
and they have got buds on them.
In the middl of the flowes they
have some bit's of white in it.



Craig Colley.

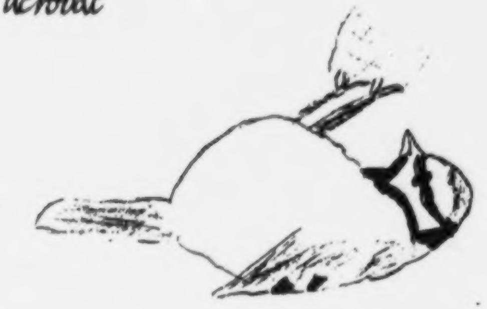
Crocus.

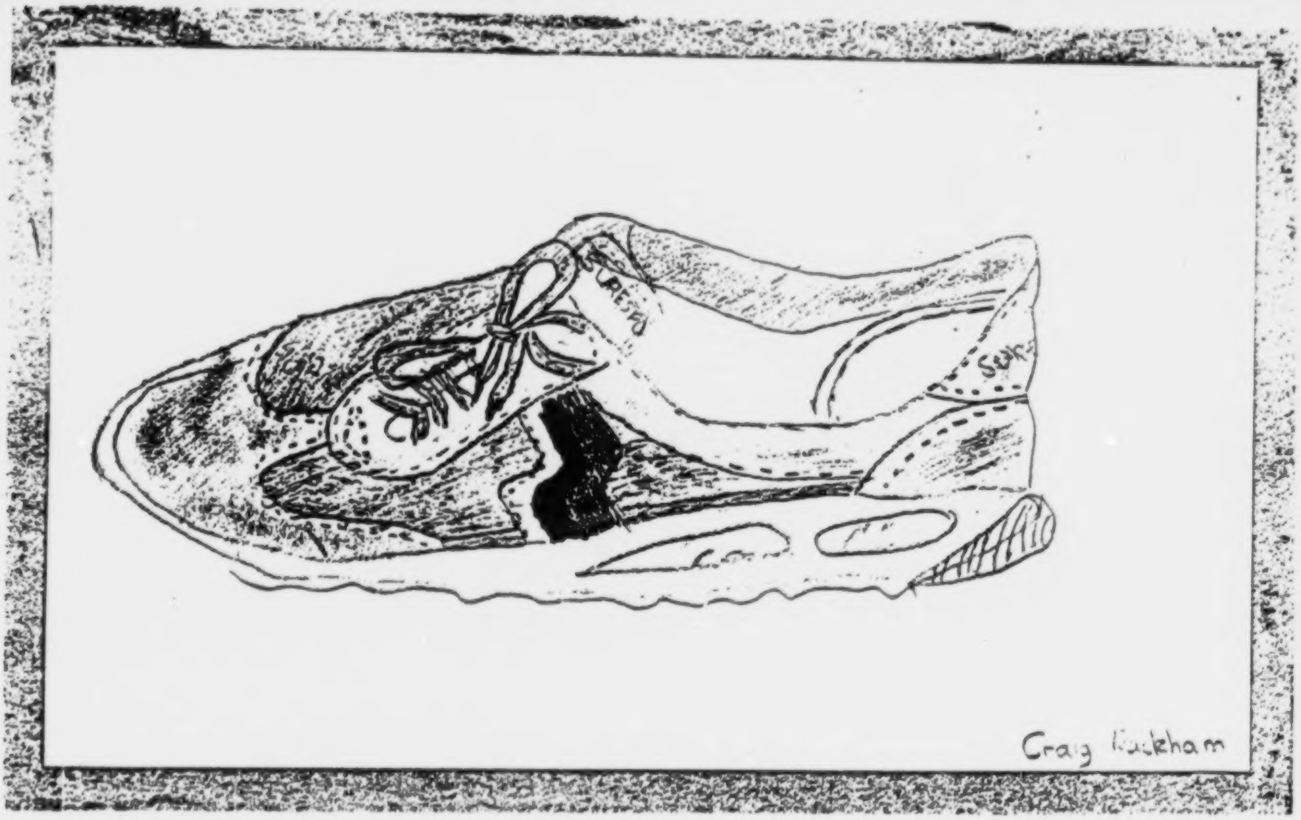
The Bluetit

A perky little bluetit
Hopped along the wall
He looked for food and scraps
But could see none at all.

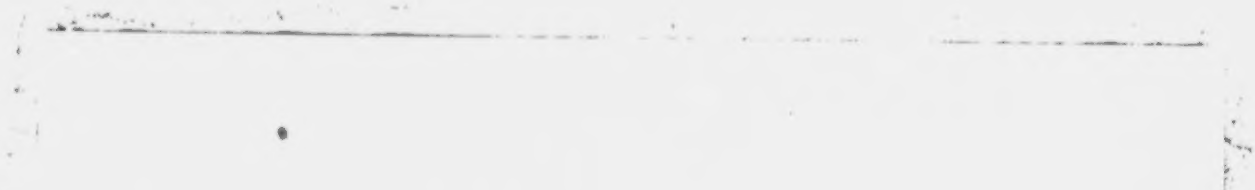
He hopped into the garden
He pecked at crumbs of bread
He spied a hanging nutshell
And flew to that instead.

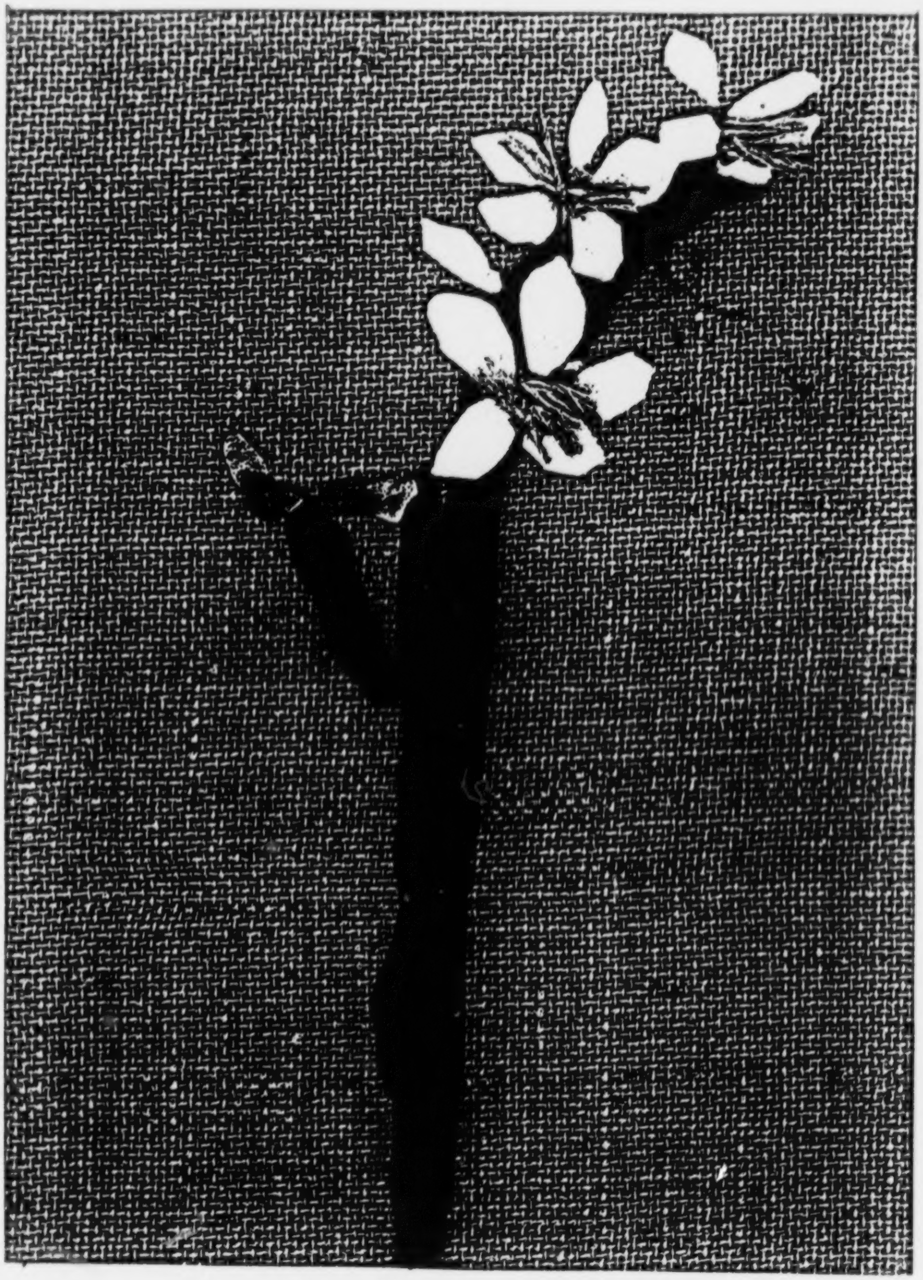
He turned himself quite upside down
And pecked hard at some fat
He swung there on the nutshell
A little acrobat

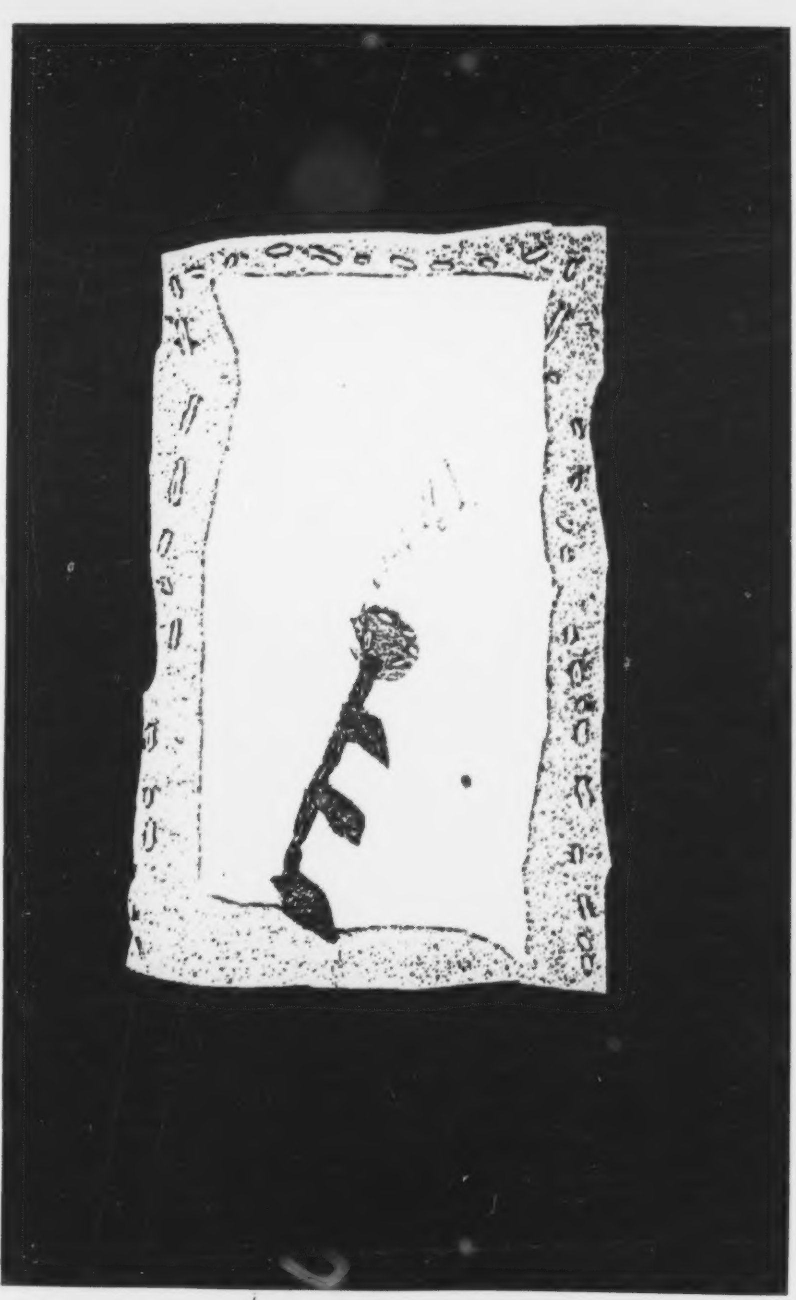


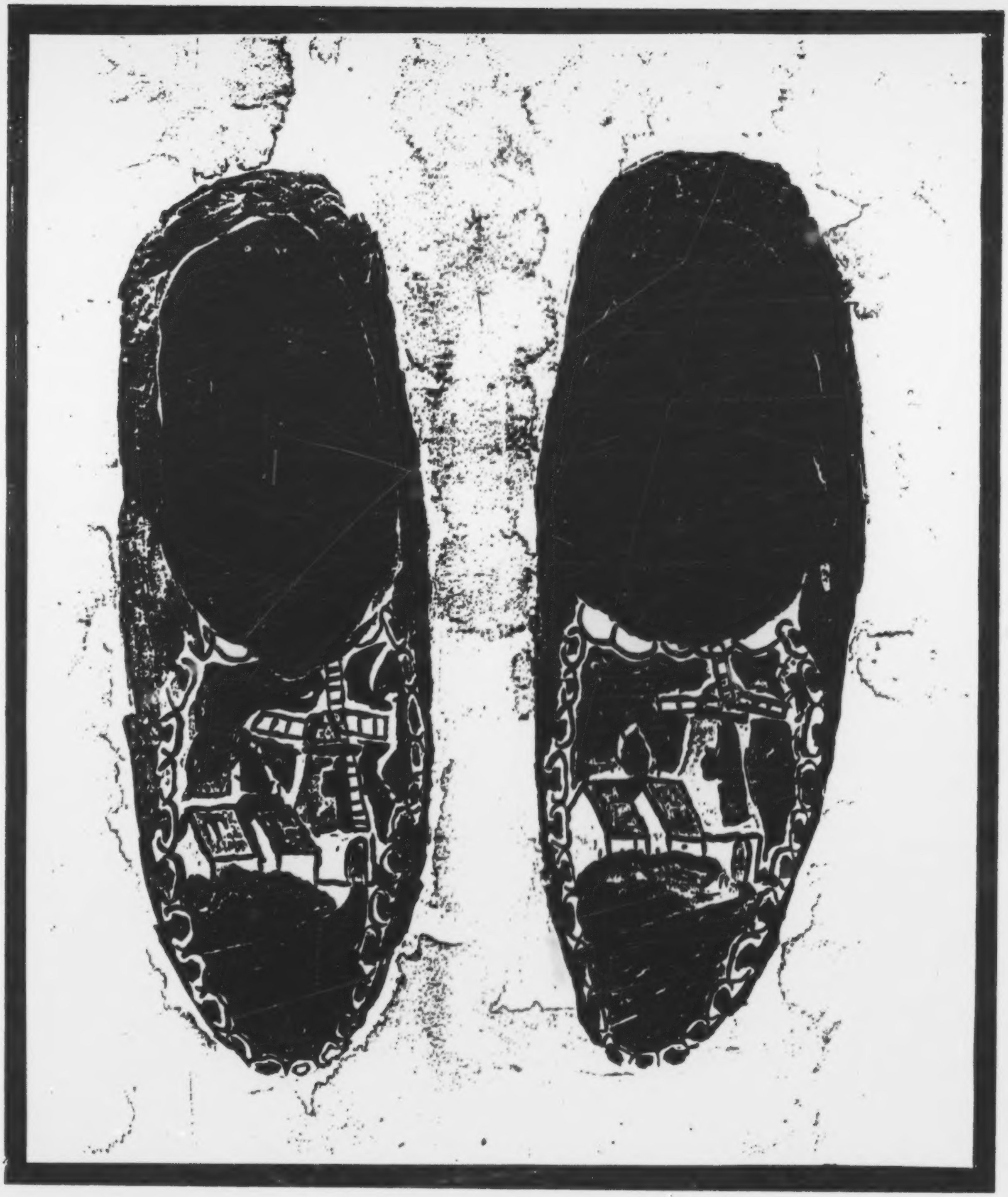


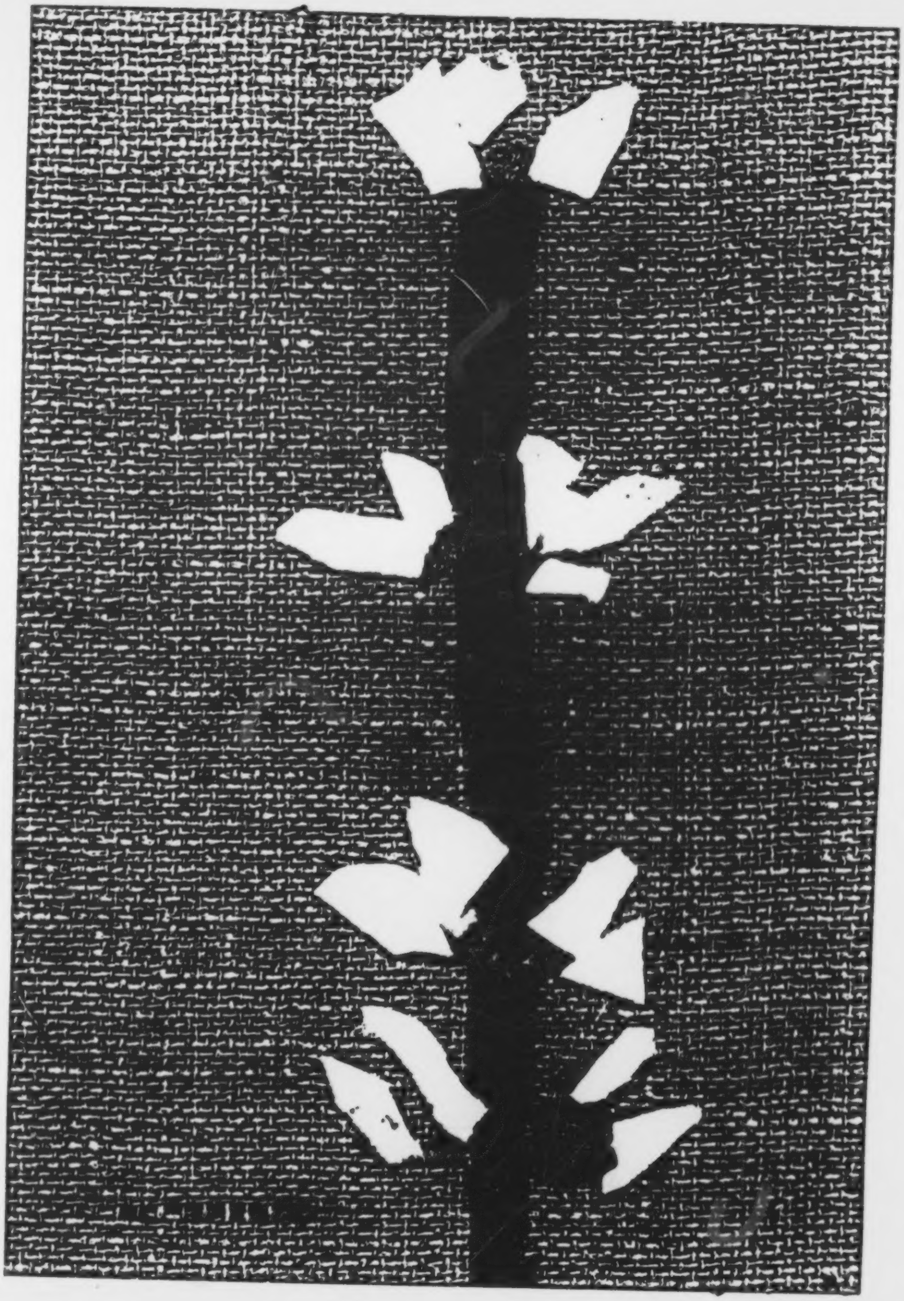
Craig Rackham











LEARNING THROUGH THE VISUAL MODE: BRITISH STYLE

Vicki Eschman

As educators we are aware that all children are not auditory learners. However, educators persist on teaching the majority of children through the auditory mode.

"Listen to the directions", "Let's take sentence dictation", "I'm going to lecture before we . . ." are common types of phrases heard in elementary schools throughout the United States. Are these auditory teaching styles conducive to learning? Probably not.

After visiting British schools this summer, I found another teaching style widely used. I observed educators dwelling on and engaging children in visual experiences. These teaching techniques seem to work and work well.

Teaching through the visual modality is apparent as soon as one enters the British School building. Murals and bulletin boards are three dimensional. Children construct two and three dimensional figures, shapes, animals, and characters. Poems, pictures, stories, and illustrations are mounted and remounted on construction paper before hanging.

Just as their artwork and expression have depth, so to have their academics. Children learn from seeing and doing. British children experiment with water and magnetic fields in their classrooms. They take nature walks to study their area's wildlife, foliage and geography. Educators incorporate math, reading, science, and geography into these visual experiences.

All aspects of the visual teaching style are encountered daily by student and teacher. This atmosphere creates an environment more conducive to learning.

TWO DAYS WITH A HEAD TEACHER
MARLCLIFFE SCHOOL, SHEFFIELD, ENGLAND

Doris French

I spent two days visiting Marlcliffe Junior and Infant School in Sheffield, England, observing classes of various age levels in the classroom, on the playground, in the gymnasium, and in group assemblies. I also visited informally with teachers in the faculty lounge.

Throughout the school there was a certain air of enthusiasm. The spark for this enthusiasm was provided by the head teacher, Tom Sharpe. In this article I would like to share my observations of this man and how he worked with his faculty, staff, and students.

Mr. Sharpe invited me to accompany him with a group of fifteen junior students (ages 9, 10, 11, 12) on a trip to a local public library. He and two classroom teachers had made a random selection of boys and girls to work on a special history project, organized and directed by Mr. Sharpe.

As we walked with the students to the library, Mr. Sharpe explained the project to me. The work had begun a few weeks earlier. The children were studying local Sheffield history concentrating on the year 1840. Each child had been assigned to be an actual person who had lived at that time; members of one prominent family, their servants, and their servants' families.

The public library where we were going to do research was the former home of the prominent family. The children had studied and toured the home, investigated the neighborhood and other old buildings, and made costumes. Slides had already been taken of them posing in their costumes in various parts of the home and around the grounds.

The students were now doing some additional research on the life style of their particular assigned person; what they ate, what education they probably had, what leisure activities they enjoyed. As the children worked, Mr. Sharpe helped them individually and directed their research with thought-provoking questions.

The culminating activity of this project was to be a program for other students, parents, teachers, school administrators, and community leaders.

Upon returning, I ate with a group of the teachers in the lounge. We could hear some band music in the distance. I asked about the band and the teachers said, "Oh, that's Mr. Sharpe. He practices with the band during the lunch break."

The next day at noon, Mr. Sharpe was again involved in a special activity. It was the Friday noon Disco, a money-raising activity open to all the children over the noon hour. Mr. Sharpe, with one parent helper, controlled about 200 children. First he asked for students who had prepared special dance routines to perform for the group. Two groups were ready to perform. He then played records and the children, of all ages, danced and sang in small groups. They spontaneously included me in a simple dance.

The final activity involving the head teacher was the closing Friday assembly for infant school classes (ages 5, 6, 7, 8). Such a daily assembly is held in all schools for moral and religious instruction. Different teachers took turns leading these assemblies. This particular assembly was led by Mr. Sharpe.

As the classes entered the room, stereo music was played. This music seemed to completely eliminate noise and talking. When all the children were seated, Mr. Sharpe discussed the song, its composer, and why he'd chosen it for them. He then talked to the children about running a race and the importance of trying one's best rather than winning. He then read stories written by some of the children about a race. The author of each story was recognized. He then called some children forward and had them display their art work to the group as he praised each one individually.

The final part of the Friday assembly was the weekly birthday recognition. Mr. Sharpe announced all those who had had birthdays that week. Each child received a gingerbread cookie with raisin buttons that matched the number of his or her age. The group then sang a special birthday song.

The activities I've described illustrate what I feel was the spark Mr. Sharpe brought to his school and faculty. The key was his personal and visible contact with students in a great variety of programs; academic, extra-curricular and social. He worked with his faculty by complementing their class activities with additional projects. He knew the students individually and provided opportunities for recognition and praise. His activities brought him out of his office to work throughout the school building. People seemed to be his priority.

LEARNING THROUGH PLAY IN ENGLAND

Brenda Thomas

ROLE PLAY: The first school I walked into in England had mothers sitting in the corridor sewing costumes, not for a play or special occasion, but for the children's everyday enjoyment. They were making a Santa Claus and a pirate's costume. They were made from beautiful remnants and looked most authentic. Children were encouraged to role play famous people, characters from books, and everyday family members. This type of play is most evident in the nursery school through the third grade. It is encouraged and time is made available for it.

LEARNING GAMES: I observed math games, reading games, and listening games. English teachers have realized that games can be a valuable tool for learning. Small groups of children playing learning games are seen throughout the nursery and primary grades. Take a concept, make a game out of it, and the children believe they're playing while the teacher knows they are learning.

LEARNING CENTERS: Water play, sand play (wet and dry) are common in all rooms through third grade. Also, there is a center for building including blocks, legos, train tracks, etc. In addition, I saw pretend beauty salons, pretend grocery stores, and of course lovely home living centers. These activities allow children the opportunity to manipulate objects, to pretend, and to learn valuable concepts.

CREATIVE PLAY: Creative play is encouraged in Physical Education. I observed a teacher encouraging children to cross the balance beam in as many different ways as possible. I observed children crossing it like inch worms, roller skaters, dancers, etc., but the most unusual was a child who very accurately crossed it like a dolphin. Creativity abounds in play in the English schools.

In conclusion, play is considered a vital part of the learning process throughout the primary grades.

ANGRAM BANK NURSERY INFANT SCHOOL

Judie Jackson

Angram Bank is located in a semi-rural area of Sheffield, England appropriately called High Green. The school is a modern semi-open plan building situated on a high hill with a lovely vista of rolling meadows and woods visible from the playground area. There is the equivalent to our public housing across from the school and some privately owned housing in the general area. The neighborhood is well maintained and the area seems more modern than other areas of Sheffield, the housing being only about ten to fifteen years old.

Many of the students come from families where one or both parents are unemployed. A number of the parents help regularly in the school alongside the classroom teachers. Parents also help with the Math Club and are invited to Reading Workshops where they work on reading activities with their own child. I was fortunate to observe "mums" and "dads" in a general activity room, reading with their children or playing a multitude of word or number games available to them.

I spent a day with a group of four- and five-year-old children and was amazed at the number of activities they were involved in. We started the day by gathering in a bay off their central activity area. I read a story to the class and we sang some songs. The only time the entire class does one thing is when they are singing or they gather in the bay at story time. The rest of the time is spent playing with various manipulatives, modeling with clay, drawing with crayons or painting with water colors on easels which are always available for the children to use. Weather permitting, they may play outside in the water bin or sand box and build and create with an assortment of snap and link toys.

Reading lessons are encouraged at various times during the day, however at no time did I observe the entire class having a reading lesson. Instead, two or three children were taken aside at a time and given individual instruction while the rest of the class was involved in other play activities.

At this age, play is considered to be children's work. Through their play, they learn something of the nature of different materials and extend their concentration and develop their motor abilities. It also provides an opportunity for them to develop their social and self-help skills. Most importantly, imaginative play promotes creativity.

A high level of creativity was evident in all grade levels I came in contact with at Angram Bank and it began with play. Several four- and five-year-old boys and girls wanted to take me to the Sunshine Cafe for lunch. I was led by the group down the hall to an area with a small counter, complete with tables and chairs, small dishes, cups and saucers, utensils, hand written menus and sandwiches and cakes made from colored sponge materials and clay. I was served sandwiches and cakes with imaginary tea poured in my cup. We were joined by several other children who alternately assumed the role of customer or proprietor. The social interaction and role playing seemed to be encouraged during school time as an essential part of their education.

Because of the semi-open plan of the building, the children are not confined to a room with rows of desks. Instead there are clusters of work areas, each with a bay with built-in seating where the teacher gathers the group for story readings, singing and group discussions. There are tables and chairs placed about a large open room where small groups of children gather to work in maths, writing, art work and any number of other activities. There are sinks and counters in each work area and art work, poems and stories are beautifully displayed. These impressive displays of the children's work is not just contained in their assigned area, but spills out into the central area of the school.

I particularly enjoyed spending a day with a very charming group of seven- and eight-year-olds. Their teacher, Rachel Renshaw, had previously been discussing "the jungle" and the readings and stories soon became a class project of creating a "jungle". They created this "jungle" in a hall area that connects two work areas. Clay, painted cardboard and a variety of other materials were used and there were lovely illustrated poems and stories about the jungle and jungle animals that were mounted on the walls around this area.

I noticed a total integration of art and creative writing, perhaps because artistic creativity is so encouraged at all levels and not confined to "art class" as in many schools in the United States. I was so impressed by the art work and stories created by this class and was very pleased to be able to bring back many samples of their writing and drawings.

During my three day visit to Angram Bank, I did not observe any children taking any kind of test or being given copies of spelling words to be memorized and I never saw them being drilled on maths problems. When a child wrote a story, the words flowed freely from their thoughts. If the words were in their vocabulary, they were put down on paper, whether they could spell them or not. When they finished writing, they could then find out how to spell the words they were unsure of and these words were put in their own hand written dictionary. Then they could correct their spelling or rewrite their story. This approach seemed to allow the children a more spontaneous and creative approach to writing.

Angram Bank's approach to learning can best be explained by a quote from a booklet about the school provided to me by the headteacher, Arline V. Kersey:

> *"The aim of the school is to give a balanced education, providing for the intellectual, social, and physical development of the children. Each child is special and comes to school with different skills and experiences. The school's approach is planned to help him/her continue to develop at his or her own pace, using his or her own experiences and interests as starting points for learning."*

PUT A SPARKLE IN YOUR MATH

Virginia Small

While in Sheffield, England we had an opportunity to visit the Maths Education Centre. We were given some time to browse through the maths games and activities. I chose three pamphlets with an assortment of ideas to put more sparkle into my maths lessons.

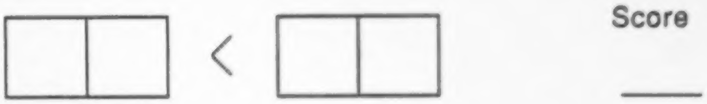
The games require a set of cards numbered 0 - 9. These are shuffled and placed in a pile face down on the table. The first digit is produced by turning over the top card and placing it at the bottom of the pile. Then turn over the next card for the second digit, etc.

Game 1

For this game you need to produce 4 digits.

If the statement is correct your score is the two-digit number on the left.
If the statement is not correct your score is 0 points.

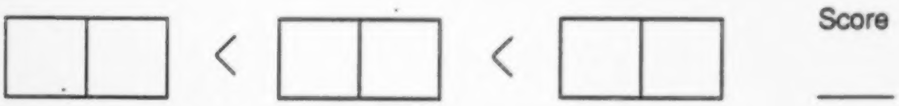
With my first graders I start off with only one box on each side until they are ready to use the two digit boxes.



Game 2

Use the same scorecard as above but score as follows: If the statement is correct score 2 points.
If the statement is correct and both numbers are even you can score 3 points.
If the statement is correct and both numbers are odd you can score 4 points.

Game 3



If the statement is correct you score 2 points.
If the statement is correct and all three numbers are even you score 3 points.

If the statement is correct you score 2 points.
If the statement is correct and all three numbers are even you score 3 points.
If the statement is correct and all three numbers are odd you score 4 points.
And if the numbers are none of the above your score is 0 points.

Game 4

Use the same scorecard as in game three.

If all numbers are in order you score 5 points.
If only the first two numbers are in order you score 2 points.
If only the last two numbers are in order you score 2 points.
If none of the above is scored your score is 0 points.

Game 5

Score

____

With this game you produce 2 digits.

If the numbers drawn are between the numbers 10 and 50 you score 2 points.
If the number is between 20 and 40 you score 3 points.
If your numbers drawn are between 22 and 34 you score 5 points.
10 points are earned if you produce numbers between 25 and 31.
Otherwise your score is 0 points.

There are other variations of this game and other scoring methods that should keep adventuresome minds intrigued. What can you develop for your classroom?

WATER - A VEHICLE FOR LEARNING

Oleta M. Kartmann

In most of the classrooms of the two infant and junior schools we toured in England there was usually a contraption which I call a water table. This was a big, tough, rectangular plastic tub set up at convenient child height on a frame with legs. It is strange how we in the U.S. can look at a tub of water and see only the inevitable splashes and splatters on the floor, the wet shoes, the muddy tracks down the school corridors as D--- makes his ninth trip to the bathroom. Why don't we see (1) the therapeutic, relaxing qualities of playing in water? Or (2) the many activities and explorations that can enlighten and enrich the child in his beginning internalized knowledge of a substance? And (3) the many things we teachers might learn if we took the time to study both Piaget's theories of child development AND that development in action?

For instance, in the nursery classes of English school's three- and four-year-old children pour water from one container to another. "Will one flat container hold all the water that is in this tall one? What do you think?"

"How many of these small cups do you need to fill this big one?"

And then there is the little one who hits the water with the flat of his hand? "Why does the water splash when you hit it that way, but if you turn your hand sideways, it doesn't splash so much?"

In the reception class (five-year-olds) there are some problems about what things will float and which ones won't. A lump of clay sinks, but if it is punched into a boat shape, it usually floats. Why? Wood floats, and cork; but a rock plunges to the bottom. Would your Match-Box car float? Or this small plastic bottle?

The seven-year-olds are measuring the water. They fill a pint container carefully with just two cups of water. They experiment with a funnel and observe how long it takes for the water to go through. They use the funnel to fill a quart container, then fill the pint container twice from the quart. There are splashes, but plastic aprons protect clothing and seven-year-olds are learning to use mops quite efficiently.

We skip a few years and go to the ten-year-olds. They have been given a problem to solve. How can you construct a boat that will carry this clay man from this side of the water table to the other? Whose boat was the best at floating? Whose design goes the fastest? Which material made the best float?

H'mmm, the children did have a lot of fun, and I can see it might help them learn about liquid measure, if they actually did some measuring. I wonder if that little guy really thought there was more water in the tall, skinny container after he transferred it from the wide, flat one? I really don't have room in my classroom for a big water table, but I just might find a big flat pan I could set on a table (one of my tables has a formica top; the water wouldn't hurt it - and the floor is tile.......) I think I will try some water projects this year. My third graders would love it!

A LOOK AT THE BRITISH WRITING PROGRAM FROM MEMORY

Nellie Rush

Writing was obviously correlated with the "Breakthrough to Literacy Reading Program." The technique used was the Look-Cover-Write-Check Routine, which encourages the child to look at the structure of the word, memorize it and then make an attempt to reproduce the whole word. If, after checking the word, it is not like the original word, the procedure is repeated.

I was particularly impressed with the children as they used known words from their "Breakthrough to Literacy" folders and made sentences in their sentence makers. *("Breakthrough to Literacy" uses small word cards with many commonly used words, and blank cards for additional words with which the children write their own sentences and stories. by placing them in individual pocket folders. B.G. editor)* There is no doubt that in the early stages of writing, the teacher gave the children instruction to copy the sentence into their booklet during the reading process. At a later stage, as soon as the children began to write, their sentence maker is turned over. When this was done, some stopped writing because they couldn't see the words and therefore couldn't copy the word.

When this happens, the children are told to look at their sentences and try to write one word at a time. The instruction was to look at one word at a time, then turn the sentence maker over and write the word.

The children are also encouraged to look at the words with attention to how they are made up and what other words they look like. They are challenged to look for smaller words within bigger words. For example, "he" in "here" and "her" in brother. On all occasions they were told to look at the word carefully and take a photograph of it. This was done to train them to use their eyes to learn the code, in hopes that the children could see the words in their minds. It is believed that children who can see the word in their minds are usually good spellers.

The whole approach of writing at this stage is to stress the visual aspect of spelling, for it is said, "that we learn to spell by "looking" at words and not by hearing them."

Many of the children are able to write simple words from memory while others are not. Some of the children could write full sentences while others were still writing words. Some demonstrated their skill by writing in their books and by writing the words or sentences on the blackboard.

Children used words with similar letter patterns for example: the-there-they were taught together in that it was seen as a relatively straightforward task to write "they" if one could write "the".

When the children were able to write single words from memory, they were encouraged to extend their writing to phrases or full sentences and then to stories.

Although some of the children made mistakes in some words, they are not viewed as failures. When mistakes were made, the children did not just alter the letter or letters which were incorrect but instead erased or covered the whole word and wrote it again until it was correct.

The teacher never refers to mistakes as something wrong, but instead as nearly right, or askes the question, "What must be done to make it right?"

I concluded from my observation that writing, when correlated with the reading program, produces good writers as well as creative writers.

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RECOLLECTIONS OF BRITISH EDUCATION

Laura Hoeke

As I look back, my recollections of British schools is one of a fairyland of learning and interaction, I saw very little direct whole class instruction. When groups did get together, they would move to a corner of the room (the children sitting on the floor almost shoulder to shoulder, rarely disturbing one another) and spend no more than fifteen to twenty minutes there. At the group get together they would call roll, talk about and explain the days activities, hear of children's findings during their explorations, share thoughts, ideas and songs, and occasionally do a little rote practice or guided instruction. As the children went about their work it was as common to see them working in a water table or sandbox as it was to see a child writing or reading. Lego blocks and paper structures were more common than text books and rows of desks were never seen. I remember my amazement and wonder as these children felt free to move about and talk during their work portion of the day. They seemed to understand that as long as their work was finished in a reasonable amount of time they could show me what excited them, pose for a quick picure or chat with one another. Getting back to their work did not seem to be a major problem for it was exciting, involving and ultimately interesting to the children. The children wanted to learn and wanted to be part of the activity.

This is not to say that the teachers did not deal with discipline, rather discipline was such a natural and intricate part of the day that it didn't stand out. The teacher and head teacher (principal) had ultimate control over the child during the school day and when a child broke the norm it was dealt with in a loving way with a note of finality. The love and respect between parents, teachers, children and head teacher was fantastic.

My greatest frustration with the English schools is that I saw no set thing a child would be learning and no way to show a doubtful parent or a curious onlooker exactly what a child was learning. I am so accustomed to American testing and paperwork that the amount of non-exact teaching was disconcerting to my way of thinking. I am sure that their work was of greater importance to them than memorizing math facts or being told the life cycle of the horny toad. They were investigating the basics of life and as they worked they touched on all the basics. But proving it is difficult in the short run. Only in the long run is it possible to see the effects in this form of education.

PROBLEM SOLVING PROJECT

Doris French

The following problem solving project was observed in the Marlcliffe School; Sheffield, England, in a class for ages 5-, 6-, and 7-year-olds. The class had been working on the project prior to my visit. Several finished projects were on display, some children were involved in the project, and some had not yet started.

The children worked in small groups of four or five students. The following written instructions were at the work table:

Build a shelter large enough for four model figures to sit in
and sleep in.
Draw a plan first.
Then write a paragraph to describe your shelter.

Rules:

1. Shelter must be shower proof.
2. Shelter must be wind proof.
3. Shelter must weigh no more than 30 grams.

The following materials were provided:

1. cellophane
2. square piece of typing paper
3. clay
4. balance scale
5. Scotch tape
6. straws
7. scissors

The children worked independently. They discussed their work with one another but seemed to develop their own play for the project. Typing paper was used for the base of the shelter. Several children tested the size with the four model figures before actually beginning additional construction. Supports were made with straws which were then covered with cellophane. Much Scotch tape was used. When finished, each child tested the weight of the shelter using the balance scale. All seemed very familiar (and comfortable) with the use of the scale.

After this test, the children took the shelter to their teacher. He then led them in testing it according to the three rules. Water was sprinkled on the shelter and model figures inside were checked for dryness. Then a hair dryer was used as more water was sprinkled to create a "wind and rain" effect.

The hair dryer was also used to check for the windproof rule; first, with the figures inside and then, with the figures removed.

One child had made a door of paper. The teacher asked why he had used paper instead of cellophane. The child said that working with paper was easier than working with cellophane. Some water got into his shelter and he was challenged to do some more work on his door.

As the teacher helped the children with testing, he asked them questions about their work and reasons for the construction techniques used.

The actual finished projects were not very esthetic but the "looks" were not important. The process and the functional success of the finished product were the primary objectives of the project. Student interest in participation was evident and each child showed pride in what he or she had made.

DREAMS CAN DEVELOP INTO REALITY

Virginia A. Small

A shopping trip in England developed into an idea that I would like to dream into a reality. I bought a book & tape of a familiar story, THE UGLY DUCKLING. I thought the children in my first grade class would like to hear a familiar story read to them by someone with a British accent. This idea further developed into the dream of developing an international library where teachers could have available stories and tapes of stories that children of other countries enjoy. With tapes in the native language, our children could actually hear the language and then have a translation to further enjoy the story. I have felt for a long time that with exposure to children of other countries, there would be a better understanding of the similarities and differences of all people.

AN ENCHANTED CLASSROOM

Virginia Small

This classroom was beyond imagination. Greeting me outside the door was a 3 ft. high buffalo made by the children out of paper mache. Just inside the door was a large totem pole made out of cardboard boxes and painted. This stood about 8 ft. tall. On the top of a cabinet was a large canoe. It was large enough for two children to sit in. The frame work was wire and balsa wood with the outside covering made of paper mache. In the center of the room stood a tree. This and all the other objects were created by the children.

The tables were in group settings and different activities were going on within each group. The first group was working on a shelter that should be water proof and wind proof. The materials available to make the shelter were a large roll of red cellophane paper, straws, clay, scotch tape, scales, and scissors. The children were to make a shelter by any plan he or she wished, then test it by placing a small doll inside and sprinkling water on it. If the doll was wet the shelter wasn't water proof. For the wind test a hair dryer was used testing the strength of the structure. A discussion would follow as to why a structure did or did not pass these tests.

Another group was working on a weighing activity. Children were to estimate the weight of various objects available around the room and record their estimates. Then they actually weighed them and the results were recorded.

A large wardrobe stood at the side of the room. Over the door was the message, "Through The Magic Wardrobe". You need to "duck down" to go through these doors and enter an area decorated by the children with wall hangings, streamers, hats, etc. There were children in this magic area working on putting foods into the four food groups.

The children in this class also wrote stories and were reading them to their teacher, Mr. Winter, as he checked their work. The unique part of this observation was that the children were self motivated and were aware of what they were expected to accomplish. These children were truly following the path of discovery-learning by doing. This is a path that cannot be traveled alone. The children were learning to work and communicate with each other. This experience offered many rich thoughts to ponder.

INTEGRATING SUBJECT MATTER BRITISH STYLE

Bob Cowles

During my visit to several British elementary or "junior schools" I was surprised and impressed with the way the teachers I observed integrated their instruction in math, science, language, social science and art. Teachers viewed instruction and planned for it in a much more integrated manner than is common in most American elementary classrooms where instruction tends to be non integrated and subject matter specific.

Rather than teaching reading this period and math next, the British teachers I observed at work used a daily common theme to tie their instructional goals and activities together into a meaningful whole.

To give an example of what I mean, I will review the daily lesson plan for a Junior 3 (5th grade) classroom I visited in Sheffield. The theme for the day was a follow up to a field trip to a local park which the class had taken several days previous. First the teacher and class reviewed verbally some of the things they had seen and done while at the park. These activities had included; a walking tour of the sights and sounds of the park; a climb up a large steep hill called Jacobs Ladder; observation of the construction of several buildings, and some measurement work at a stream which meanders through the park.

After reviewing, which set the stage for the day's instructional activities, the teacher began to explain to the class as a whole that they had the following assignments to work on and complete for that day.

1) A poem about Jacob's Ladder,
2) A reading assignment called "The Walk",
3) A picture of the Round House,
4) Construction of a Jacob's Ladder badge,
5) Worksheets on the stream.

Rather than impose a sequence which students had to follow for completing these activities the students were allowed to choose what they wanted to do first, etc. This was a significant aspect of the British classrooms I visited. At this point the students broke up into self selected work groups and began working on one of the activities. Some students worked independently while others worked in small groups. The teacher moved from child to child and group to group clarifying, encouraging and re-directing when necessary.

The math lessons for the day resulted from plotting stream depth and course based upon measurements taken by the class when on the field trip.

(See worksheets following article.) Science was accomplished through the use of library books and reports on water creatures, some of which they had observed at the stream. Reading and writing instruction was accomplished as students read "The Walk" and wrote their own poems about Jacob's Ladder. Art was integrated as the students painted their representations of one of the buildings at the park known as the "round house". The social studies lesson that day was a self concept activity and consisted of designing, making and wearing a badge proclaiming that they had climbed Jacob's Ladder.

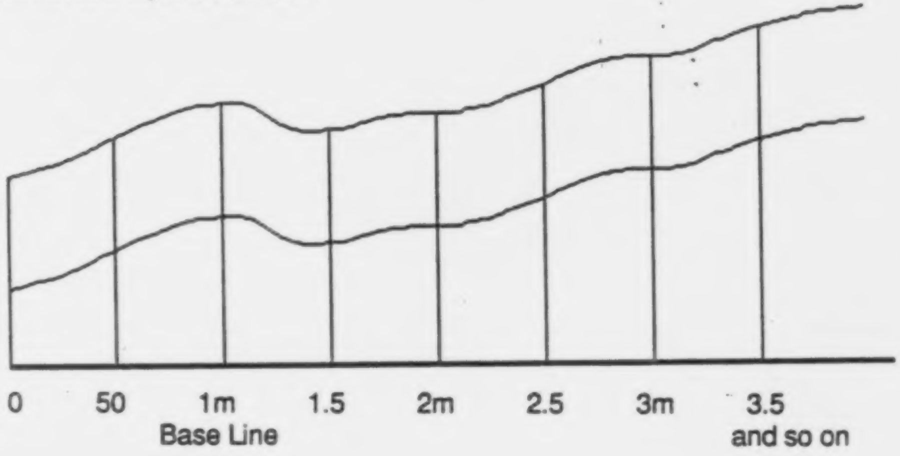
Each child was dealt with as an individual by the teacher. Some students were English language deficient as a result of recently immigrating to England from India. The reading and writing activities for these students were adjusted accordingly by the teacher. As would be expected in any classroom, not every student was on task all the time. There was, however, a prevailing attitude among the children that learning was not only expected but could be fun and a spirit of cooperation prevailed.

This same thematic approach to instruction was observed in several different schools I visited and was not confined to one or two teachers but was generalized throughout the schools.

Each of the schools I visited seemed to be characterized by a highly child centered, activity oriented approach to teaching and learning. This was evidenced by individualized programs, opportunity for student choice, cooperative learning strategies, provisions for student movement in the classroom, and lots of hands on learning activities geared toward critical and creative thinking.

PLOTTING THE COURSE OF THE STREAM

You will need 2 tape measures.

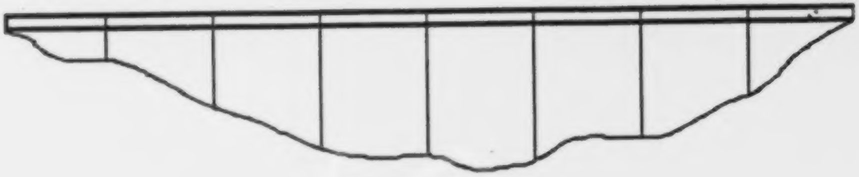


1. Measure out a Base Line 10 metres long.
2. Measure from 0m, at right angle to Base Line, the distance to the near and far bank. Record the results.
3. Do the same every 50cm along the base line. Record the results.

Distance on Base Line	Distance to Near Bank	Distance to Far Bank	Distance on Base Line	Distance to Near Bank	Distance to Far Bank
			4.5m		
0cm			5.00m		
50cm			5.5m		
1.00m			6.00m		
1.5m			6.5m		
2.00m			7.00m		
2.5m			7.5m		
3.00m			8.00m		
3.5m			continue		

DEATH OF THE STREAM

You will need a tape measure, metric ruler, and depth gauge tape measure.

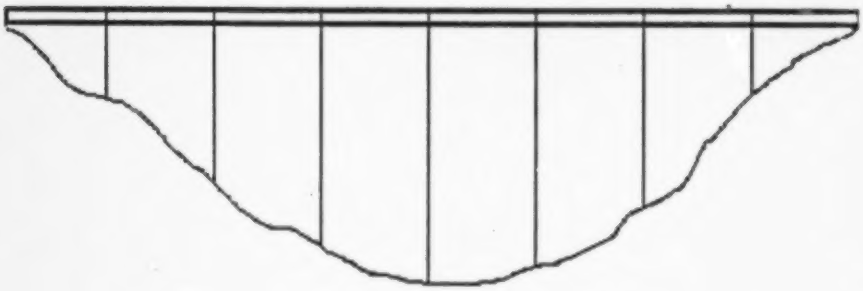


1. Stretch tape measure across the stream.
2. Measure every 25cm across, and down in the water to the stream bed.
3. Write down the depth from the surface to the bed.
4. Do this for every 25cm across the stream.

Distance across tape.	Depth
0	
25	
50	
75	
1m	
1.25	
1.50	
1.75	
2m	
2.25	
2.50	
2.75	
3.00m	
3.25	
3.50	

A CROSS-SECTION OF THE VALLEY

You will need a tape measure and a wooden beam and a spirit level.



1. Place beam across the stream and level it.
2. Measure vertically every 25cm to the ground level, using the tape measure. Record your results.

Distance across beam	Depth	Distance across beam	Depth
0cm	0cm		
25cm			
50cm			
1m			
1.25m			
1.5m			
1.75m			
2m			
2.25m			
2.5m			
2.05m			
3m			
3.25m			
3.50m			

A KALEIDOSCOPE OF IDEAS

Jeanne L. Wright

If a picture is worth a thousand words, this must be the premise in which British children are instructed under to begin writing.

As I entered into the infant school, ages 6 and 7, in Lynncroft, England the first time, I was overwhelmed with children's drawings and displays. I spent most of the day walking throughout the school studying the walls, ceilings, and windows. It was unnecessary to ask what was being taught as it was obvious what was being studied from the projects and pictures displayed. My first reaction was to grab my pen and camera to start taking notes and pictures of all the exciting projects.

It begins in the infant level where writing is first introduced. The teacher will show a picture. The teacher and the children think of a word or phrase which might be used to describe it. Then this word or phrase is attached to the picture. One method used was to cut the letters out of a magazine or a newspaper; thus, reinforcing visual contact. Also, the opposite method may be used by showing a word or phrase and then creating a picture.

Another common method for this age group is the use of a sentence board. The sentence board is a board with words which are at each child's ability level. The children use the board to arrange phrases and sentences. The phrases and sentences are edited by the teacher before it is written in their notebook. This keeps the student from being frustrated by having to erase.

I observed the middle level which seems to concentrate on various methods of writing books. The teacher read a story to the children. They discussed possibilities for the title. After discussion, the children worked on creating their own title for another story read and illustrated it by making a book jacket. Pieces of cardboard were placed inside the book jacket to create a 3-D effect. The finished product was hung from the ceiling with string.

Another method used was creating pop-up books. This method was done in a step by step procedure. The first step taught would be a simplistic design; such as, drawing lots of V's on a flat sheet of paper, cutting along the V and then folding it back.

A second step could be more detailed. One class illustrated a haunted house on white paper, cut the shutters of the windows so they would fold back, attached the paper to construction paper and then created another picture behind the opened window.

The last step would be the book with every page fully illustrated and a story to go along with the pictures.

I would also like to mention that a large assortment of pop-up books are made available to the children to view and read to stimulate their thinking.

I want to emphasize the fact that everything written is illustrated. Everything illustrated is displayed. Projects are displayed once in the class area and then again for public view in the hallways all over the school.

To relate the difference in attitude between students in the United States and students in England would be the response of the question "What is your favorite thing to do at school?" American children often respond, "Recess." When I asked that same question to an eleven-year-old British girl, her response was "I like quite a lot of things. Writing, numbers, and drawing are some of my favorites."

A DAY OF CHOICES IN ENGLAND

Brenda Thomas

Lee is a six-year-old child in Sheffield, England. His Mum (Mom) brings him to school at 9:00. He walks into a brightly decorated room filled with the students' art work. His day begins with the children sitting on a large rug for large group time. The teacher takes roll and then explains the choices of the day. Lee must decide if he wants to do math, reading, build a bridge, work with a computer, write part of a story, draw a self portrait, work with a computer, build something that flies (made with legos), go shopping in a pretend grocery story, play in a home living area, or read a book in the reading center.

Lee decides to do his reading. He has a small book marked at page 34. Lee reads to his teacher or a volunteer Mum in a one-on-one reading situation. Lee is given ample time to figure out a word and immediate help, with no student onlookers, if he does need help with a word. Lee is dealt with in a kind, loving manner. After completing a short story, he is asked to draw a picture and write a few sentences to represent this story. Lee has his own dictionary, consisting of 26 pages marked with the letters A to Z. On these pages are words he has previously asked for in order to write sentences. Any new words he wishes to use are added to this dictionary. Therefore, he learns to use his dictionary and write sentences independently. It also helps him to recognize many words. I feel sure that drawing a picture to represent the story and writing sentences expressing the main idea, such as he did, is an excellent means of increasing reading comprehension. Students work at their own level and are not grouped. The reading scheme is similar to our basic reading program except it is divided into many small books instead of one large one. This allows greater flexibility in story choice and level of difficulty as well as sense of completion. These are easy to hold and easy to place in a student's work drawer, shelf, or basket.

When Lee finishes reading, he decides to build a bridge. Plastic clay, scissors, and straws are the only materials provided to construct this bridge. The one set condition regarding this bridge is that the bridge must be sturdy enough to support a man made of plastic clay. There are no other directions given and Lee has to design and construct this bridge by himself. Lee is not pressed for time, and he begins to experiment with the clay and straws.

It is now time for recess. Lee goes outside and may have free play, or he may decide to play an organized game. I observed several circle games similar to ours. Teachers rotate playground duty and plan games for the students who wish to participate. I would be remiss if I did not mention that some teacher always remembered who had playground duty and brought that teacher a cup of coffee or tea. There is a general concern among the students and teachers that I am still trying to figure out. Lee also has the option of visiting the live animals housed at this school. All three schools I visited had some sort of housing for small animals. I observed chickens, ducks, rabbits, and raccoons. I was told that local farmers lend animals to the schools. The children are allowed to handle the animals as well as having the responsibility of feeding, watering, and caring for them. The children showed great pride in the animals kept at their school.

Lee returns to his room and continues to plan and construct his bridge. After several false starts, Lee begins constructing a bridge he is satisfied with. He completes his bridge and waits anxiously for his teacher to put it to the test. Lee's bridge is strong enough to hold the man made of plastic clay, and he appears very proud. Some children did not fair so well and had to begin again. Next, the children wanted me to build a bridge. This was a new experience for me and I was afraid my bridge would not pass the test. Fortunately it did.

Lee now decides to do his math. Lee gets his math notebook and discovers that he needs to begin working on task card number 21. Each child works at his own level. There are no math books. The problems are copied from cards into a notebook. Children are allowed to use counters and Cuisenaire rods to solve the given problems. The teacher checks the notebook immediately and any missed problems are corrected. If the teacher deems it necessary, the teacher will write more problems in the students notebook for him to complete in order to show proficiency in the present concept. A child does not move on to a new concept until he can show mastery of the present concept.

The school I visited has an hour for lunch. The cafeterias served nutritious meals that pleased the children and the staff. After lunch there was plenty of time to enjoy the same activities described at recess.

There was a large group time after lunch. The activities of the day were reviewed and children were redirected to choose activities for the afternoon. Lee decides to do an art project. Hanging from the ceiling was a lovely, large, yellow submarine that the children had previously made. This submarine had enough portals for each child to place a self portrait. Each child was to look in a mirror and draw a picture of his/her face. In the schools I visited, art projects were individualized and were done with a specific purpose in mind. This project was done to complete the submarine portals as well as experience self portraits. Creative art of all kinds abounds through the schools. Children are proficient in drawing, cutting, modeling, etc. without the use of patterns.

Several classes went into the hall (all purpose room) for music. However, if a student wanted to stay and complete an assignment he/she could. Lee chose to go to music. In music the students were allowed to choose the songs they wished to sing, "Puff the Magic Dragon" and "The Yellow Submarine" were two favorites. There was not a specific music teacher. One of the regular teachers led the music, and a volunteer pianist came to the school.

Lee returns to his room and completes his drawing.

Lee then decides to go outside to sink a bottle. There is a large dishpan filled with water, several plastic bottles of various sizes, and a pile of stones (rocks). Lee chooses a bottle and must count the number of stones it takes to sink this bottle. He then reports his findings to the teacher. Lee enjoys this project and sinks several bottles. Quite often subjects are integrated. For example math and science are combined in this project.

It is now 3:30 and time for Lee to leave. His mum meets him at school to walk home.

Observations: In talking with the teachers I found that activities are changed on a weekly basis. I observed these same kinds of activities in both open and closed classrooms. Teachers are largely responsible for developing their own curriculum. However, unity of ideas must exist, because I observed the same activity in two schools thirty-five miles apart and the teachers had never met.

I do not feel qualified from my short stay in England to make a comparison in the learning processes, but I have concluded that the children were very happy. I did not observe the usual behavior problems found in our schools. Could that stem from the fact that young children did not have to sit for a long period of time and work on dittos but were able to make choices and take some ownership in their work?

A FULBRIGHT EXCHANGE TEACHER'S REPORT

David Floyd

An analysis of the nature of history in the senior high school curriculum in Prince George's County.

Introduction

For the past 15 years, history syllabi and teaching methods have undergone a radical change in U.K. schools. By comparison the U.S. history courses I came into contact with during my year seemed strangely static, and not far removed from the kind of history being taught here 50 years ago. The purpose of this paper is to:

(i) examine the nature of these differences

(ii) explore possible reasons for these differences.

Part I: The Essential Differences

The Place of History - school curriculum

(i) In most U.K. schools, history is taught as a compulsory subject in its own right through Years 1-3 in a secondary school. In some U.K. schools it is subsumed within a broader framework of humanities or social studies. Thereafter in Years 4 and 5 it becomes an optional subject which, on average, is studied by 50 - 60% of a year's group.

(ii) In Prince George (P.G.) County, Md, history consists of two compulsory courses which have to be taken as a graduation requirement. In order to graduate from a senior high school, students need to obtain 20 course credits, some of which are optional, some like history are compulsory. History makes up one tenth of every student's graduation requirements.

Content

(i) In Years 1 - 3 most U.K. history curricula are built around the following criteria,

(a) chronological development of Britain
(b) patch studies of at least one foreign country
(c) historical questions which exemplify problems associated with the skills of an historian.

In Years 4 - 5 a wide variety of syllabi are taught and tend to reflect the interests of the school and staff. Among the most popular are,

(a) Schools History Project - a skills based approach
(b) Modern world history
(c) Social and economic history 1760 to present

(ii) In P.G. County, the two compulsory courses consisted of:

(a) World history - from Plato to Nato taught to the 10th Grade
(b) 19th and 20th Century U.S. History taught to the 11th Grade

Methodology

There is no one common style of teaching history in the U.K. However in P.G. County, in common with every other subject, history had to be taught in a particular format which was known as the Directed Teaching Activity. Based on research into classroom management by Madeleine Hunter, every lesson had to consist of 7 clear stages. In order to ensure that these steps were followed, each teacher's evaluation was built around this scheme.

Frequency

In most U.K. schools History would be taught in 4th and 5th Year twice/three times per week depending on the timetable. On average this would lead to between 130-140 minutes contact per week.

In P.G. County the same timetable is followed every day which gives a total contact time of 5 X 50 minutes per week which = 250 minutes. Over the year the difference can be quite staggering.

U.K. = 190 X 140 = 26,1600 = 443.3 hours.

U.S. = 180 X 250 = 45,000 = 750 hours.

Students in the P.G. County would appear to spend, on average, 307 more hours on history per year than most U.K. students.

Part 2: Possible Reasons for these differences

It is interesting to speculate why two countries which share a common language and whose histories are inextricably linked, should interpret their subject in such a radically different way. The rest of this paper postulates possible reasons for this difference culled mainly from discussions, syllabi and meetings I attended during my year. I do not claim any conclusive evidence nor originality.

(1) Power structure of the discipline

In the U.K., the nature of the subject is largely dictated by the Universities and mediated through the five main examination boards. Until recently, teachers have played a major role in influencing the shape of school history:

(a) The Schools Council History Project, set up in 1972 by the Government of the day to promote curriculum change, was made up mainly of practising teachers.

(b) More and more teachers have become closely involved in the way in which the subject is examined both as assistant and chief examiners. The dramatic expansion in numbers taking '0' and 'CSE' exams and now GSCE has forced examination boards to appoint more practising teachers. Similarly the development of new methods of assessment, particularly concerning coursework, have involved more and more teachers in determining the emphasis placed on the subject.

In the U.S.A. the power rests far more with the elected lay members of the school board. Every syllabus has to be ultimately approved by them. Subject specialists and County advisers are free to develop new history courses, but, unless they meet the wishes of the elected board members, their ideas will remain still-born.

In some areas of the U.S. the born again Christian movement was causing certain textbooks to be removed from the approved school board lists. Two of the textbooks I used were banned in parts of Louisiana because they did not pay sufficient attention to the role of religion in motivating men and women to achieve great things.

(c) Crucially, as far as history in the U.K. is concerned, market forces have played a key role in shaping the subject. The development of the options system in most schools in the late 1960's and early 1970's has forced the subject to compete for popularity with, in schools such as my own, at least 20 other subjects.

Customer appeal became an important consideration if the subject was to retain any foothold. In the U.S., history is a compulsory part of the common core and not an elective. This may help to illustrate the crucial political role which U.S. public opinion feels the subject has to play. It may also explain the essentially conservative, static nature of the subject. The customer can clearly exert no pressure if he seriously wants to graduate.

(2) The Purpose of History teaching

a) Increasingly in the U.K. teachers state that the objectives of their particular syllabus are process based. The criteria used to select particular content usually relate to the development of certain historical skills, e.g. empathy; understanding causation.

b) The objectives for both the U.S. courses which I taught were essentially content based. The 12 objectives for 20th century U.S. history begin with such phrases as "describe", "trace", "list", "identify". An analysis of the Criterion Referenced Test reveal that 39 out of 60 questions test solely factual recall. Out of the remaining 21, 15 test basic historical concepts such as imperialism or Third World.

The remaining 7 relate to either causation or the consequences of change. Significantly, nowhere in the list of 12 objectives are the skills of causation or consequences mentioned. All twelve objectives are concerned with relatively low level intellectual responses.

(3) The political backcloth

The school board member in the U.S. exerts far more control over the curriculum than school Governors in the U.K. Until recently, outsiders have labelled the curriculum of U.K. schools as very much a secret garden. The statutory articles and instruments of government of U.K. schools, have helped to largely protect the professional autonomy of teachers to decide the most appropriate curricula for their pupils. Central government has recently discovered that the only way to really make their elected voice heard is through financial manipulation.

However, History in the U.S. very much reflects the prevailing mood of public opinion and is likely only to change when the local political complexion changes. History has become very politicised in the U.S.A. An analysis of the objectives of the courses and the content taught, suggests that the following objectives were uppermost in the minds of the School Board which I worked for:

(a) An overwhelming desire to nourish patriotism. One book it was suggested that I use for 19th and 20th U.S. History was called, "The Rise of the Glorious Republic". Needless to say I refused!

The content of both of the courses which I taught tended to suggest that U.S. hegemony over much of the world was entirely justified. The rest of the world was very much the oyster of the U.S.A. I attended a meeting which sought to establish some criteria for making the World History syllabus more manageable. Teaching the entire history of the world, even in 750 hours is clearly impossible and poses serious questions of selection. Should you teach the history of India and forget Brazil etc? The unanimous view at the meeting was that selection should be based on how far a country had impinged in a significant way on U.S. history or ideology. Studying the history of a country for its own sake was clearly a waste of time. Little wonder that few students which I taught had any respect for any country other than their own.

(b) A belief in the divine march of progress and its clear link with free enterprise. Socialism and communism were mentioned for their vices rather than their virtues and merely confirmed the paranoia which all American students felt towards Russia.

(c) A concern to strengthen the foundation of democracy. Maryland insisted that all students passed a separate test in "Functional Citizenship", 19th & 20th History was seen very much as a device for reinforcing a belief in the value of U.S. democracy and a general contempt for anything different such as constitutional monarchies or social democracies.

(4) The Hidden Curriculum

In a sense the concentration of factual recall and base concepts in the Criterion Referenced Tests also helped to reinforce the underlying objectives outlined above in (3):

(a) A perspective which accepts the past as a received body of uncontested wisdom, will not view the country nor its political system in a critical way. I venture to suggest that the skills of analysis and weighing the reliability of historical evidence are more likely to promote a true spirit of democracy.

(b) Acquiring factual information and concepts is not far removed from accumulating material goods and possessions. The ablest student is thus the richest; he who can amass and display his wealth of factual recall.

(5) Social Control

U.K. teachers always bemoan the tyranny which exams exert over their teaching. Yet in the U.S. tests and quizzes play a far greater role. They are frequently used as a device for controlling students. Given the lack of external moderation teachers were free to test whatever they wished whenever they wished. Thus tests and quizzes had to be easy to construct and grade; factual recall is easy to measure and test; analytical skills considerably less so. Essays are far more time consuming to grade.

In P.G. County, County wide tests, euphemistically called Criterion Referenced Tests, had recently been introduced. They too were obsessed with factual recall and this more than anything else promoted a narrow view of the subject. Since the underlying aim of these tests was not to test students but to test teachers, students were tested at the beginning and end of a course and the so called "gain" of each pupil quantified and evaluated. Here was a convenient and quick measure of an effective teacher. Those whose stduents showed little "gain" in terms of factual recall were labelled as poor teachers and sometimes complained that adminstrators used their class CRT scores to browbeat them. From an administrator's point of view, this system is "objective" in that factual recall is easy to measure; analytical essays would be considerably more contentious. Thus the unhealthy obsession with low level intellectual responses must be viewed a convenient agent of social control of students by teachers and of teachers of administrators. Since administrators are appointed by the Board of Education, close political control of what actually happends in the classrooms becomes a clear reality.

Conclusion

It has been a fascinating yet a rather worrying experience to be a participant in a system which is so monolithic and static. A system which is full of strange contradictions, which is desperately keen to meet the challenge of Japanese economic growth through dynamic industrial change yet which has curricula in schools which are very conservative in outlook. Perhaps history is viewed as a calm, reassuring port of call in an ever moving sea. I found it extraordinary that no U.S. history teacher I met viewed the subject in any other than a conventional way. My own philosophy of the value of history teaching is neither novel nor unique. Its true merit lies I suggest,

> *by proving the value of the process of study as much as or more than by showing the value of the knowledge acquired, that we must justify the study of History at school ... it is a training of the judgment in the weighing of evidence, in the study of character, in the verification of causes and the tracing out of results.*

This gem appeared in 1897 in a book edited by R.A. Barnett called 'Teaching and Organisation'. I find it hard to understand why such ideas have never crossed the Atlantic and rather worrying in a country which unabashedly regards itself as the bulwark of democracy and freedom.

THE ROLE OF PARENTS IN THE BRITISH SCHOOLS

Nellie Rush

Parents, in the British School System, play an important role in the learning process of their children. It has been said that good readers come from good homes. If this is true, then the parent's role should begin long before the child enters school. For the British parents it does. Their role starts at home with reading, listening, and talking to their children and providing many experiences for their enjoyment.

Parents are welcome to visit the schools at anytime; however, they are asked to telephone for an appointment to avoid the possibility of a long wait. During the year, meetings are arranged with staff consultations to discuss their children's progress and welfare.

All parents are automatically members of the Parent-Staff Association, who meet regularly during the school year and have three representatives on the Board of Governors of the school to represent the parents.

In case of absences, parents are asked to telephone or write a note to the school explaining their child's absence, and to make sure that their children arrive at school on time.

In case a teacher wishes to punish a child because of a broken rule, the parent must be given a 24 hours' notice before their child can be kept in detention. Other times, letters are sent home and parents are invited to the school to discuss their child's behavior.

Contacts are made with parents at particular points in the school year when important decisions need to be made. Parents are also asked to contribute money at the beginning of each year to be used for various projects and participate in fund raising projects to enable the schools to purchase different items.

The parent's role continues by encouraging their children to read in their spare time and to complete any projects or homework sent home by the teacher.

Some schools provide classes for the parents concerning the role they play in the education of their children. Others provide the parents with a list of suggestions as to how they can help their children learn and enjoy school.

At one particular school, the parents come in for an hour and listen to their child read, while other parents join the school library and enjoy reading to their children. Parents are encouraged to take an interest in whatever their child may be involved in, whether it be reading, writing, music, art, crafts, or play. Therefore, many of the parents give voluntary help to the schools whenever they are needed.

To make school a happy place, parents talk about school as being a happy place with their children. Sometimes, younger children come into the school with their parents and listen as an older brother or sister reads. For young children who are not in school and cannot read and write, parents are encouraged to let these children express their thoughts and feelings through play by making things and talking. It is believed that play is a child's work and is the way in which children learn about the world. Therefore, parents are encouraged to play with their children and participate in activities around the house.

Parents are seen throughout the school helping the children with many activities. They are made to feel that they share an important part of their children's education. One of the Headteachers made this remark, "If children are to be good readers, it will depend upon the parents, as well as the teacher." Therefore, the role that the parents play is an important aspect of the British Education System. I tend to agree with the Headteacher. If children are to be successful, they need the involvement of more parents in our schools.

PRINCIPLES AT HALFWAY

Vicki Eschman

Halfway is a middle school in Sheffield, England. This school serves children from eight years to thirteen. Children come from a wide range of economic backgrounds.

I had the pleasure of visiting Halfway Middle School for three days. I was extremely impressed with the administration, educators, and the academic achievement of the students.

As in most schools, the administrators set the tone for the school. Upon arriving, Head Teacher John Wilson gave us an extensive tour of the facility and, more importantly, his views on education, community involvement, and local politics. This gave us an insight into the British Education System.

We felt very comfortable with the teaching staff as they were willing to share ideas, techniques, and personal philosophies with us. Much of the sharing took place in the teacher's lounge. Teachers were encouraged to visit the lounge to discuss how to better help a specific child or to schedule art or afternoon activities.

Another vital limb to Halfway's body was the community involvement. Parents groups were in session hourly. In the center of the school was a small public lounge with reading materials. Dances, wedding receptions, and instructional classes were scheduled in the multi-purpose room year round. John Wilson reported that the building was in almost constant use seven days a week.

Children cared for a garden in the middle of the school courtyard. Older students served lunch to younger students -- family style. Children tutored less gifted peers. Children were the core of Halfway. Administrators, educators, and parents were there for and because of children.

These are just a few of the principles and positive attitudes I encountered at Halfway Middle School. I would feel comfortable teaching at Halfway and probably more importantly, I would feel privileged to send my own children there.

THE SPIRIT OF LYNNCROFT

Oleta M. Kartmann

Both the first and final impression of Lynncroft School in Eastwood of Nottingham near Sheffield, England is that "here is a real community." Teachers are obviously dedicated to learning. And their learning involves the total process of living. Children are not taught from textbooks, they are taught from life.

Lynncroft is built around an open air central court area where different kinds of experiences with living go on. A mother hen and her chicks are being cared for by the children. If a child becomes a bit rough or handles a chick too much, another child gently reminds him of proper behavior. There is also a greenhouse in the open area. It is used for various experiments and projects. Converting solar energy into heat was the current experiment. There are a small tree and some shrubs in the area.

In this area some boys had been given permission to experiment with a magnifying glass to concentrate the sun's rays on some newspaper which started a fire. Safety measures had been taken; the boys were eleven-years-old and a teacher supervised. The experiment was successful and there were no casualties. The boys had direct experience with converting sunlight to heat.

Everywhere in every direction one could look, there was evidence of learning in action. Every area had displays. Every child was engaged in activity. There were no stagnant, passive, boring areas of education. The child was directed to some activities and when he finished one of them, he moved on to another.

To say that there is no competition and no jealousy among students would be a statement one could not prove. To say that there is a high degree of cooperation, caring, and pride in their own and each other's accomplishments is a statement which is proven over and over. A young girl conducted a visitor around the premises of the school and attempted to answer the visitor's questions. The child could not get a science demonstration to work, so she went to get Tim. "Tim is a good inventor. He can get it to work!" And he did. No frustration or envy on the girl's part, simply the acknowledgement that when help was needed, there was another student who would be willing to help. There was no exaggerated pride in himself on the boy's part; he was receiving recognition from the girl and from the visitor's interest.

There were art projects of many kinds, styles, and materials. Many of the art displays involved a form of mathematical thinking along with art. Such ideas as symmetry, rotation, patterns, and tesselation were extremely well done. Some art projects were done from life as were the owls and a field mouse which had been painted in a type of water color. Other very striking displays included work using a variety of natural materials such as seeds, dried grass, and other plants. One young boy was sitting at a table that held a flower pot with a large fern plant. The boy was constructing a "shadow" of the plant - silhouette to us - with black construction paper on a large white sheet of paper. He was painstakingly cutting out small leaves, about the same size as the actual fern leaf, to glue in place on the white paper to complete a branch of the fern. Some other children had already completed similar tasks. Their work had been placed on the wall for display. By observing the abundance of student work, visitors to the school soon realize that here is an environment which allows for much creative thinking.

A little later in the morning, the boy with the fern was observed working on math. He had a text similar to a workbook from which he was copying problems into his teacher-made individual booklet and computing answers. Cuisenaire rods were available to him, as they were to all the students. There was an almost unbelievable willingness of the children to work on their assignments. Only two or three boys in an eight-year-old group had not finished in time for another all group activity. The teacher did not draw a lot of attention to the boys -- she merely said, "When you get finished, please join us," in a kind, but casual way; and that is what happened. The boys worked, put things away, and joined the large group.

There appeared to be total dedication to learning among the children. They took their work seriously. They were personally involved in the tasks. They were not threatened, nor bribed, or otherwise coaxed or coerced into doing the work. Their ideas were taken seriously by the teachers. No one was belittled or laughed at for atypical ideas. Dull children were difficult to identify because all were attempting to learn and all were having some success, although not all were necessarily at the same level of achievement.

One young boy had constructed a type of "solid parallelogram" from connecting flat blocks approximately three inches by six inches by one-fourth inch in a staggered fashion; a very interesting structure. He received from the teacher, not just a "That's nice, Jimmie," but genuine admiration with, more importantly, a question - "Could you think of a way to make this structure out of other materials? The child walked away in deep thought, totally absorbed in this new problem. It was amusing, perhaps, to participate vicariously in this child's response to such a puzzling new responsibility, but it was a serious matter for study to the student. This incident is typical of the British method of teaching through problem solving.

The only hint of frustration that was heard during the two days of observation was in the comments of an Upper Level Junior teacher (eleven-year-old students.) She was definitely feeling some pressure from the school to which her students would go next. (The comprehensive school - for twelve through fifteen-year-old students - is much more authoritarian and apparently less concerned with individualized learning.) Some of her students with lower ability were trying to learn about fractions. They were using the Cuisenare rods to help them visualize the meaning of the fractions. The teacher believed the concept to be too difficult for these children, but was attempting to teach them so that "the next school will recognize that we have tried." She hoped merely that "when they have fractions next year, the boys will remember something they've done here.

There was not a lot of music education in the traditional sense available for observation. It could have been that on this particular day not much had been scheduled, vocal music apparently was taught in larger group sessions. One young man played a guitar and sang with his children some songs they had composed together. Another group of children listened intently at the end of the day to a student teacher who demonstrated the guitar, citern, mandolin, violin, banjo, and a type of Irish drum. It was a very beautiful way to close a lovely school week.

An assembly earlier in the day (before lunch) gathered to watch a dance two girls had been practicing. These were probably ten-year-old children. Their rhythm and timing were excellent. They had obviously taken much effort to choreograph their movements to the music. An effort by another two girls to produce a play was not an outstanding success, but the patience and tolerance exhibited by the teacher and the student audience was admirable. It was quite a "slapstick" play with little planning, the kind of performance that a teacher usually wishes he had not allowed. The teacher did give several warnings to "bring it to an end now, Girls." After this finally happened, the teacher did not criticise the performance, but did ask them to be more cooperative the next time for the reason that not enough time was available for such a long performance.

During this same assembly, two young girls presented a storybook they had written and illustrated. They read the story aloud, very capably, although one child was apparently a little shy and did not read her pages very loudly. The story was well written and illustrated, something which the girls could be happy to share with their classmates. What is a better way of motivating children to use their learned skills of written communication than by sharing the product for all to experience and appreciate.

Assemblies were used to give instructions, to recognize accomplishments of the students, and to give important information for the day. Daily observance of religion is required by the state, therefore one assembly per day is required of all classes. It was explained that this is a "difficult" situation as not all the teachers have the same beliefs. So as not to compromise anyone's conscience or beliefs, most of the religious observance took the form of singing a hymn into which one could put as much devotion as he/she felt, while the music could be enjoyed in any case.

The faculty and headmaster of Lynncroft are well educated, dedicated people. From the nursery personnel to the upper junior level, to the head master, John Dichmont, all teachers and helpers have considerable expertise and can verbalize well the "hows and whys" of their work. Also, there is the feeling of progressiveness, of wanting to do even more and better work. There is almost a "missionary" feeling among some teachers that "I've finished my work here; everything is going well, so I must go on to accomplish more!" In fact, when they have perfected their teaching skills and methods, some of them do move on; some to advise other teachers, or to teach in other schools which are in the process of trying to achieve the excellence exhibited at Lynncroft. For example, one of the best of Lynncroft's many excellent teachers is leaving to join the teacher education staff of the Sheffield Polytechnic Institute at the end of this term.

Certainly, life at Lynncroft School is dedicated to learning. From a mothers' group which brings their infants for mornings of sharing ideas with each other and with special school personnel, through nursery school, infant, and junior school, there are parents, teachers, and students who are totally absorbed with one aspect or another of learning. Each day is part of an on-going tide into which one puts all of himself, not just to be carried along, but to help create with one's own movement and impetus, a strong current of life that is rich, demanding, and ultimately satisfying. Lynncroft School is a community - where "community" means sharing of ideas, of experiences; and where the well-being of all is manifest in the well-being of the individual.

NETHER GREEN MIDDLE SCHOOL

Judie Jackson

Edie Pistolesi is an art teacher and creative consultant for Binney and Smith, Inc., the company that makes Crayola crayons. On a recent visit to St. Louis, she was quoted by the Belleville News-Democrat as saying,

> *"The good news is that children have an abundance of imagination. It's everywhere. Creativity is simply imagination expressed. All children will draw or pick up a tool and make a mark without being told. From the beginning, we need to nurture their scribblings."*

She urged adults to have enthusiasm for a child's ideas and to treat their creations with dignity, and added, "The bottom line is self-esteem. Those used to thinking creatively will be the visionaries, the ones with ideas. They'll be the creative chefs, creative businessmen, creative engineers. They'll be more flexible."

Pistolesi goes on to say, "The people who maintain creativity into adulthood often seem to be those children whose ideas were respected, appreciated and encouraged by adults who were open to things that might be considered out of the ordinary."

This respect, appreciation and encouragement was put into full practice at Nether Green Middle School in Sheffield, England. From the moment I entered the rather austere, turn of the century stone structured main building, I was greeted by an array of colorful drawings. In the center of the building is a large meeting hall with a stage at one end and library area at the other, with classrooms leading off this main hall. What captures your attention as you enter this area is the fact that on every wall and on top of every bookcase and cabinet are beautifully displayed samples of the children's artwork, crafts and models.

I fully expected to find an abundance of artwork at a nursery school, but the children at Nether Green are between eight- and twelve-years-old. American schools seem to place less importance on arts and crafts for children in that age group. The artistic abilities of the students at Nether Green seemed to be more advanced than children of the same age group I have observed in some of the schools in the St. Louis Metro-East area.

Four delightful young ladies, eight-and nine-years-old, took me to an activity room to show me how they were making beautiful African prints by slicing a potato in half, carving a design in each inside piece, dipping the carved halves in various colors of paint and stamping the design on a long piece of white linen-like material. Children were designing and constructing rocketships, robots, cars, trucks, and buildings out of junk items, such as tissue boxes, milk cartons, plastic soda bottles, old newspapers, etc.

I visited a class called Crafts and Technology and observed nine- and ten-year-old students constructing a wood framed scale model of a train they had seen while on a field trip. This rather formidable project provided a very practical integration of their math, motor and artistic skills. Through this project and other like endeavors, the children were becoming acquainted with the basic principles of design, engineering and construction. Boys as well as girls learn to sew, and a display of finely crafted puppets fashioned after Robin Hood characters were testimony to their skills.

I was also quite impressed by the creative writing abilities of these children. Remarkably well-written and imaginative stories and whimsical little poems were proudly and elaborately displayed on classroom walls.

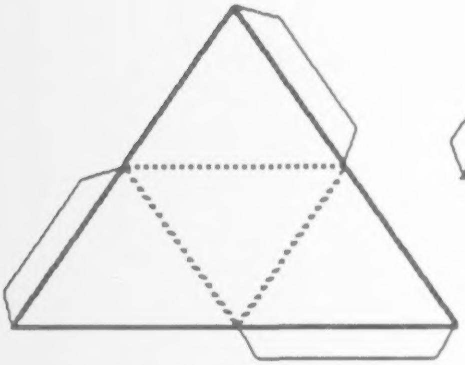
I asked a teacher if I could remove some stories and poems from the wall in order to photocopy them. She agreed, but asked that the originals be returned, as they were "very precious" to her. I found her concern to be indicative of a great deal of pride in the accomplishments of her students. I took particular notice of the fact that the teachers spent much of their breaktime exchanging amusing anecdotes about the children with a great deal of fondness and affection.

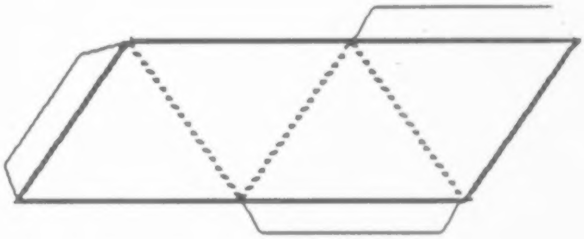
Nether Green Middle School not only offered their students the essentials of a well balanced curriculum, but enhanced their education by providing an environment that encouraged expression of their imagination through art, literature, and crafts. Hopefully, this encouragement will foster their desire to further develop their creative abilities and take that creativity with them into their adulthood.

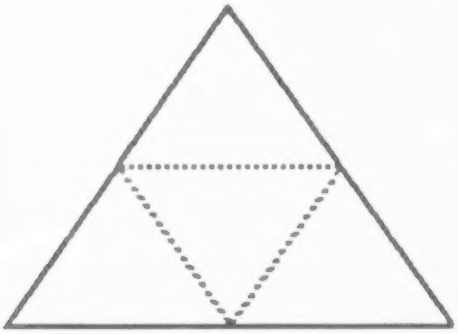
MATH SOLIDS FOR YOUNG CHILDREN

Virginia Small

Children grow up in a 3-D world so why not let them experiment with math solids at an early age? I found a booklet in England that suggests having the children try making a tetrahedron. Different types of patterns may be used depending on the age of your group. Here are some of the patterns suggested. You will need tape or glue. Ditto copies should be used for the younger child.







You have now made a tetrahedron!! Turn it onto another side. Does it look the same? Does it look the same no matter which side you rest it on? How many different sides can it rest on? Four? That's why it is called a tetrahedron!! Can you teach a friend or your parents to make one?

READING AS TAUGHT IN BRITISH SCHOOLS

Nellie Rush

I was impressed with the British reading program and from my observations and participation I conclude that the British schools produce earlier readers, as well as better readers.

As I observed the interest of the students and their enthusiasm, during reading time, it was obvious that "something good was happening in Reading." Just what is that "something"?, I asked. Could it be their reading program, "Breakthrough to Literacy?" or could it be a combination of many things, such as motivation, experience, creativity and involvement? I concluded from my observations it was all of these and even more. British children are taught to think in an imaginative way by creating stories and sharing ideas. Since reading is taught from the child's experience, each child is looked upon as an individual with individual needs who comes to school bringing many kinds of experiences, which the teacher uses to develop skills and realize each child's potential.

Reading in some British Schools begins at the early age of three, in a caring Nursery environment where the teacher provides for the development of pre-reading. The children are read to by teachers and parents. Stories, rhymes, and talk, play a part in developing reading skills. A variety of natural materials, creative, constructive and imaginative play materials are used to promote self-expression, observation, exploration, and experimentation and play an important part in the child's learning process.

The teacher reads a story about a Teddy bear, and the child is asked to draw a picture about the story. After the drawing of the picture, the teacher will talk with the child about the picture. Then she asks the child to tell her something about the picture. If the child had drawn a Teddy Bear, he might say, "Teddy bear brown," one word is chosen and written in the student's book "Teddy". The child is asked to copy the word under the word written by the teacher.

After reading the word, the child is asked to draw a picture to illustrate the word "Teddy". So the child draws his bear again. Now the teacher asks the child to write the word "Teddy" in his booklet. Once the child has learned the word "Teddy", the teacher goes on to the next word "bear" and then "brown" using the same process. Before some of the students leave Nursery school, they will have learned many vocabulary words from their own experience.

After Nursery, the students are transferred to the Infant Department. In the school in which I observed, there were six classes, two mixed ability, 4 1/2- to 5 1/2-year-olds, two mixed ability, 5 1/2- to 6 1/2-year-olds, and two mixed ability, 6 1/2- to 7 1/2 year-olds.

"Breakthrough to Literacy" seems to be ideal for a class with a wide range of abilities, allowing each student to work at his own pace, meeting individual needs and abilities. The students work, cook, sing, build, relay, and explore in the process of learning to read.

It is obvious to me that reading continued in the Infant Department is a more creative way, building upon the students' past experiences from Nursery. Again, many experiences are provided for the students to stimulate and motivate them to express their ideas through their experiences.

Reading continues with the teacher asking the students to draw pictures within their own experience. Sometimes a story is read to the students and they are asked to illustrate the word with a picture. Words are sometimes written on a chart, and the student may be asked by the teacher to illustrate the word with a picture. After drawing the pictures, stories or sentences are written about the pictures. It seems that the key to teaching reading is to create experiences in which language, writing, listening, and spelling are explored together. An example of what I saw:

The teacher asked the child to draw a picture. The child draws a picture of a "Cabbage Patch" doll. The teacher discusses the picture with the child. Teacher, "Can you give me a sentence about your picture?" The child replied, "I like my cabbage patch." "Shall I write this sentence in your booklet?" asked the teacher. The child said, "Yes". When the teacher was finished, she asked the child to copy the sentence in her booklet beneath the example.

The child was asked to read her sentence to the teacher from her booklet. The teacher then takes the words from the dictionary chart and gives them to the child to build or construct the sentence on the sentence maker. Any words that the child used in the sentence that are not in the Dictionary Chart the teacher writes on a card and gives to the child. This new word becomes a part of the child's dictionary. The child works with the words until a sentence is constructed, in this case, "I like my cabbage patch."

When this task is accomplished, the child is asked to write the sentence in his booklet, without the aid of the teacher.

Once the sentence is written in the booklet, the child must read it again to the teacher. The child might be asked to illustrate the sentence with a drawing or the child may go on to dictionary skills, matching the words in the sentence with the words in the dictionary chart, and saying each word as it is placed in the chart. The teacher may continue with another picture and sentence or she may go on to having the child write stories, using the same procedure as before. The teacher will move the child on when she feels that the child is ready.

Twice a week the child chooses a book from the book shelf and read to the teacher or teacher's trainer. The teacher at this point will evaluate the child's reading as she listens. Comments are made in his or her booklet or a note may be sent home asking parents to listen to the child read. Parents are invited into the school once a week to listen to their child read and they play an important part in the reading program.

In addition to seeing and listening to good readers, I believe that the British approach to reading offers endless opportunities for good readers and prove a wholesome environemnt whereby learning can take place and teachers can teach to the needs of each child.

A MOST UNUSUAL HEAD TEACHER

Virginia Small

His secretary threw up her hands and said, "I can never find that man!" Where was this most unusual head teacher who was in charge of an Infant and Junior School in Sheffield, England? He was with his students.

One morning he took a group of students on a mile walk to the library so they could do research on a play they were preparing for a special occasion. The student studied material about the characters they were to portray. This group was gone about two and a half hours.

On another occasion during the noon hour the head teacher was in the gym conducting a "disco" for the students. He played records and provided time for the children to develop and perform a dance or song for the other students. All students paid ten pence to attend and the money was used for improvements around the school.

The next day, at the noon hour, we heard a brass band practicing. These schools don't have specialists in art, PE, and music as many of our schools do. Who was conducting this band? As you might guess, it was the head teacher.

On Friday afternoon of each week the Infant (primary) section of the school has an assembly. At this time records are played as the classes assembled in the area provided. Stories and art work the children have completed are displayed and complimented by the head teacher as he directed our attention to each picture or reads each story. It was at this time that birthdays were observed. The students were each given a chance to blow out their candles on the cake and were to choose a gingerbread cookie that had the same number of raisins (buttons) as the child's age.

A most unusual head teacher whose prime concern was to help each student develop to his or her greatest potential and experience the excitement of learning.

FROM GANG WARS TO LOVE IN AN ENGLISH SCHOOL

Victor Lind

I found a visit to Wyburn Junior and Infant School in Eastern Sheffield to be an inspiration.

We began our visit with head teacher Joan Brier giving an introduction to the school and its philosophy. Opened in 1928, the school was built in response to extreme problems in the area. High rise apartments had generated two competing groups of people. Towards the end of WWI, this competition was taking the form of gang warfare over gambling and other matters in the area with murders as a common result. Lookouts against opposing gang members and police interference in activities were paid as much as $100 per day. The collection of houses, currently served by this school was built to replace the high rise apartments, as housing for one of the competing groups. An estate for the other group was built elsewhere.

The community today continues to have a reputation of being tough and one of the most deprived areas in the city. One observation is that the people in the area exhibit traits of "acute paranoia with illusions of grandeur." Housing is mostly owned by the city and rented to the families. Even though opportunities to purchase have recently become available, with unemployment in the community as high as 50-60 percent, little change in that direction has occurred. People in the estate tend toward a tightly knit society. There are many single and second parents. Prostitution exists, as do drug problems with parents and in the community, although not in the school. These factors all contribute to irrational parent behavior which, in turn, has fringe effects on the children, making their family experiences frequently "wobbly."

The style of the school,age 5-12, was extremely formal. Parents were kept out, classes were separated according to sex and were largely subject/teacher-centered. With Jane Brier's arrival as Head Teacher in 1981, immediate changes of these characteristics began.

Brier brought to this position a perspective which she describes as more sociological than educational. That is, she reasons and acts from the premise that if people, including students and parents, can be helped to gain a larger vocabulary of responses to situations, to relate well to others, and to feel good about themselves, academic learning probably will take care of itself. She prefers this approach to the alternative of participating in turning out what she refers to as "brilliant psychopaths."

This is the thrust of her activity as Head Teacher. This thrust finds expression in the example and standards she sets for her teachers, in her dealings with the rest of her staff, with students, parents, and her administrative superiors. Specific instances of this include successfully influencing many of her teachers to operate their classrooms in more open, student centered ways; to arrange either termination or early retirement for teachers not ready to make such changes; regular parent/student workshops in which parents come into the school to spend time helping their own children learn; supportive disciplinary policies for both students and teachers; an open door and willingness to spend a great deal of time listening to, talking with, and counseling students, parents, and teachers; and generally setting a tone of warmth, caring, and respect for students and parents, as well as for her staff.

Additionally, Brier spoke about an incident dealing with discipline problems. First there was an instance involving a school policy called Day Report. This is a practice calling for daily communication between the school and parents of a child on "Report." It is designed to help children learn to control their own behavior. She told of an older boy who was having challenges at home and, as a result, was also experiencing problems controlling his behavior in school. The boy had been on Day Report previously. On this occasion, when finding efforts to control himself particularly challenging, he asked to be put on Day Report again because he had found that it had helped him in the past.

Brier also explained that she feels that a woman has an advantage over a man in the position of Head Teacher in this area. This is because of the code of behavior of the men in the community about treatment of women who are not their wives. Even though these men have no qualms about fighting other men or even beating their own wives, their code does not permit them to harm women who are not their wives. And Brier uses this trait to her advantage in being willing to see and talk to irate fathers, when a male Head Teacher might not be willing to do the same. Meeting and talking with fathers is one more way in which she feels she is working for the good of the children and adults in the community.

Upon completion of the background session, Brier led me on a tour of the school building, showing me around to the various classrooms, including the parent/student workshop room, where several parents were working with their children. During this tour, a number of children were encountered in the corridors, having one reason or another for being there. Without exception, they were treated with respect and courtesy by Brier, as she forthrightly interacted with them to help.them achieve their purposes.

Following the tour, for the remainder of that first day and the next day, I was free to visit in classrooms with children and teachers as I saw fit. And from those ensuing experiences, the most memorable impressions follow.

There was lunch with the children that first day in the somewhat noisy but orderly lunch room. During that lunch, I was politely and attentively provided for by both the children and the lunch room staff. During a walk on the playground, I also experienced friendliness, warmth, and affection from the children, as they displayed their curiosity toward their American visitor.

The afternoon was spent visiting classes in session. In these, a prevailing theme was children openly, freely, and contentedly going about frequently self-selected learning activities. While so doing, they were treated with understanding and respect by their teachers.

I visited a First 2 class (6-year-olds). The classroom was arranged with three major activity centers; language, numbers, and creative. Children were separated into four fixed groups. Each group was mixed ability and contained five or six children.

The school day for these children consisted of four relatively equal time blocks. As the day progressed from one time block to another, the four groups of children were rotated from one activity to another sequencially, with a different group engaging in each of the three activities in each block plus an elective group in which children individually chose one of the three activites they would like to do during that time block, along with the children whose group had been rotated to that activity. The teacher's time was spent being available as needed for helping out with questions, checking results of children's work, etc.

The children engaged in these activites freely, openly, and satisfyingly. While so doing, their teacher related to them calmly and quietly, and with caring, although also sometimes strict, understanding.

I also spent time visiting in classrooms of older children (approximately ten- to twelve-year-olds). Three of the older classes often combined for presentations of lessons. The teacher strongest in the subject area of the lesson to be taught, presented the lesson. Then each teacher oversaw the students in his/her own class as they worked through the related exercises. The lesson that afternoon was on measuring. During presentation of the lesson, students listened quietly and attentively. After the lesson, the children, with little fuss and bother, divided up the available equipment needed to do the exercises, and dispersed to the necessary places (including the playground to get some of the dimensions) to carry them out. Questions by the children about procedures and other matters were asked and answered in a relaxed, gentle and orderly manner. The whole experience proceeded smoothly and harmoniously.

Another older class had recently been on a field trip to a nearby area which offered special programs for children. At the time of my visit the class was in the final stages of writing individual papers about that trip. Much of the period was used by those children who so desired to read their papers aloud to the rest of us present. In their school experience, the children had been encouraged to be spontaneous and original in their writing. This came out in the papers read as one boy spoke of a body part reference. The teacher didn't rebuke the boy. Instead, she took the incident good naturedly and in stride, later explaining to me that he was a boy who tended to say/write whatever "popped into his thought."

In each of these classrooms, there was less student choice in learning activities than I felt true in the younger classrooms visited. The feeling in each was one of general pleasantness and enjoyment and the children expressed an air of being quietly at ease.

Practical, meaningful caring and love had indeed replaced gang wars in this English school catchment area.

CURRICULUM BRITISH STYLE

The following are position papers written by teachers and head teacher at Angram Bank Nursery Infant School, Sheffield, England. These are in their original form so please forgive any "xerox" markings. The materials included below are kept in the teacher's lounge, easily accessible and often used by any and all teachers. In fact, individual teachers are in charge of weekly faculty meetings and prepare and present such materials to the rest of the staff. There are few text books and fewer teacher's manuals found in British classrooms. Teachers take great pride in developing curriculum and in sharing their discoveries amongst their fellow educators. These materials are kept in the teachers lounge and were used extensively by teachers.

--Barb Goldenhersh

ANGRAM BANK NURSERY INFANT SCHOOL

We would hope that future curriculum development in this school would pay particular attention to cross-curricular issues. There have already been some initiatives by individual members of staff who have been developing strategies to encourage girls to become more involved in the use of construction toys, and other technological activities. We would like to develop this further to consider other areas of the curriculum which may need intervention to eliminate sex sterotyping.

The other major area we would wish to develop would be the examination of means whereby a multi-cultural and anti-racist approach could be incorporated into all areas of the curriculum. We feel that this is particularly important in this school where pupils have very little contact with people from ethnic minority groups, either in school or in their social contacts outside school.

A third issue which we would be interested in developing is the integration of children with special needs, as we are receiving an increasing number of requests for nursery places for such children, and all staff feel that they do not at the moment have the expertise to meet the needs of such children adequateley.

In all areas of curriculum development, we would wish to involve and co-operate with the staff of Angram Bank Junior School and would be interested in joint projects with other schools in the area.

The Development of Mathematical Understanding

At the end of the first school, the child is, according to Piaget, moving from the intuitive stage to the stage of concrete operations. At the intuitive stage, thinking is based on perceptions and not on reasoning. It is stimulated by rich experiences of manipulating things and, through the years, is applied to more complex situations.

At the concrete operations stage, logical operations are carried out with concrete materials. These operations - or activites of the mind, internalised actions - require a child to take a number of factors into account and so encourage the kind of logical thinking necessary in all aspects of mathematics. Lack of experience with concrete materials leads to inadequate mental operations and inadequate development of the abstractions required for more advanced mathematics.

The age at which children reach these stages may vary and in some areas of mathematics children may be moving into the stage of formal operations, where they can consider possibilities and follow a form of reasoning. Other children will still be very much in the intuitive stage. Providing meaningful mathematical experiences requires the teacher to know each child well. Cockcroft (1982) talks of a seven year gap in the range of ability for one age-group of children. For children to build up concepts they require experiences and activities out of which to form these concepts. R.R. Skemp (1971) sees mathematics as a structure of closely related concepts arrived at by a process of pure thought. Mathematical concepts have only mental existance so, in order to use one's intelligence for mathematics, one has to turn away from the world of sensory objects to an inner world of purely mental objects. The child needs to move to the stage of

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iv) Verbal stimuli must be strongly controlled - a child's interpretation of a word may be different from that of the teacher.

v) Terminology should be liked to a physical model.

vi) Varied experience of the same concept needs to be given.

vii) Consideration needs to be given as to how a new concept may modify ideas about previously learned concepts.

viii) Chronological age is no evidence of the stage of development of a child's thought process.

Alongside this conceptual development must come the acquisition of skills and facts. Pupils need to know and remember some basic mathematical facts at each level if progress is to be made with confidence. Memory demands can be reduced by a sound conceptual understanding of the subject. This will help in the recall of facts which need to be remembered and cannot be discovered - they are arbitrary and cannot be supported by a conceptual structure , (x means multiply, 0°c is freezing point)

Skills, a combination of actions by which a task is performed include 'not only the use of number facts and standard computational procedures but well established procedures which it is possible to carry out by the use of a routine' (Mathematics count 1982) A child can understand without becoming adept in using a particular skill involved. The child will need time for practice and consolidation. If practice comes without understanding, retention will not be as great and the skill cannot be built on to develop further skills.

We must now look to the classroom for ways of facilitating the development of mathematical understanding.

Cockcroft (para 243 (1982)) states that:-

"Mathematics teaching at all levels should include opportunities for:-

Exposition by the teacher.

Discussion between teacher and pupils and between the pupils themselves.

Appropriate practical work.

Consolidation and practice of fundamental skills and routines.

Problem-solving, including the application of mathematics to everyday situations.

Investigation work.

The actual approach used to teach a particular piece of mathematics will depend on the topic itself and the abilities and experiences of the teacher and pupils. There needs to be flexibility in approach as different methods will suit different people and different situations. However, the catagories listed above should all feature in mathematics teaching.

P.Smith (1986)

PRACTICAL MATHS.

The space around us is important from the day we are born and understanding relationship of shape, size and position within that space establishes for us our immediate environment. It is vital that children are made aware of these relationships from an early age. They need to be introduced to the language of shape, position and size (length, height, width, area, volume and capacity).

Experience and vocabulary must come before the more formal use of standard units of measurement we use as adults.

Young children believe that an amount of (for example clay) can be altered by changing its shape. Seeing water poured from a tall bottle into a flat dish shaped container of the same capacity, does not convince them that there is still the same amount of water.

In weighing, young children associate weight with size. Knowing nothing of densities they assure 'the bigger it is, the heavier it will be'. When approaching weighing we must give children many experiences with a variety of materials, especially where the weight bears little relationship to the size eg. polystyrene/nails. Balances are also used at first instead of scales. The children can then see "heavier/lighter/balance". They are also encouraged to use their hands and feel the weight. This comes before the use of kilos and grams.

Being able to tell the time is only one part of understanding 'time' - if anyone ever does completely! The passing of time is emotive - half an hour of enjoyment can seem like 5 minutes, whereas 5 minutes of unhappiness can seem more like half an hour. However, children need to be aware of the passing of time and understand the sequence of:- hours, times of day, days, months, seasons - and have a notion of speed - fast slow, acceleration.

Money is a completely man-made idea, using units of currency to purchase goods, labour or time. Its value changes constantly. At school children are regularly exposed to shopping situations, establishing the ideas of purchase, payment and change. Understanding the value of coins takes time. In coins we have 1 object (coin) with a value of 5p, 10p, 20p and 50p.

We hope that the experience we provide bring a better understanding of mathematical principles and help children enjoy maths. instead of fearing it.

Mrs. Smith - March, 1983,

EARLY EXPERIENCES

The practical introduction of matching, sorting, ordering and collecting of sets - developed from any situation which may arise. Nearly all play situation give opportunities for some maths experiences and the ideal time to introduce and use the correct language. They also provide the opportunites for early experiences in the areas of practical maths by the comparing and ordering of quantities, lengths, weights and shapes and by making them aware of spatial relationships.

MATCHING - Many of the activities are relevant to the pre-reading stage. We are also developing their sight and this development must be taken into consideration when preparing material.

Matching 1 to 1 (pairing - one for each) cup/saucer; child/cake; bottle/straw. (This should be seen as a tool rather than an end in itself - leading to counting and the understanding of the invariance of numbers).

VOCABULARY - SAME/LESS/MORE/TOO MANY/TOO FEW/ENOUGH/NOT ENOUGH/AS MANY AS/SAME AMOUNT.

Matching like objects - logi-blocks (1 attribute first)
snap, pelmanism (by colour/shape/size/pattern)

Matching related objects - egg/eggcup; cup/saucer; girl/boy;
knife/fork; bat/ball.

Matching by counting - using as great a variety of material (commercial and natural) as possible.

Matching number symbols to sets/sets to number symbols.

Match to complete set. HOW MANY MORE?

Match equal sets (different arrangement of objects).

IDEAS AND MATERIALS TO USE

Setting the table;
Games in the hall using mats/hoops 1 to each/2 to each;
3 Bears/3 Little Pigs;
Penguin jigsaw (1 piece picture);
Snap;
Logi-blocks.
Farm fields/animals;
Seven dwarfs;
Five currant buns;
Dominoes;
Pelmanism;

SORTING

It is essential to develop the language while they play, using general classroom activities as starting points. There is a lot of sorting required when it come to tidy-up time. Sorting brings order to our lives.

General catagorising
This goes on all day - sorting the children themselves into very unstructured groups - sitting/standing; in the bay/in the classroom; have dinner/go home; have milk/don't have milk; brought a coat/haven't brought a coat; needs to go on number trolley/english/creative; needs washing/doesn't need washing; books on rack/books on shelves.
Children sort material into own catagories (their own interpretation of a set).

Structured sorting
Colour; Shape; Colour/Shape; Texture; Size; Sand/Water Play;
(use natural material as well as commercial).
Sorting into sets of identical objects.
Sorting into opposites - black/white
red ball with blue spots/blue ball with red spots
happy/sad
up/down

continued....,

Sorting into objects related in some way (crockery/cutlery/toys).

Catagorising by deciding on criteria e.g. plastic shapes - things to ride on; buttons - use on babies clothes; flowers - garden.

Re-sort same objects using different criteria e.g. flowers - by colour; buttons - by size or colour.

Sorting coins/centainers/weight/shape.

Sort by 1 property first - then 2, 3 etc.

Sorting in Wendy Corner	Clothes/cutlery/crockery.
Sorting Collage Material	Rough/smooth/soft/hard/cold/warm.
Water	Pour/spray/float/sink/blow through/holds water/ allows water to pass through.
Sand	Digging/smoothing/pouring/sieving.
Commercial equipment	Lego/wooden bricks/cans/farm animals/beads/plastic sorting trays/logi-blocks/plastic coins.
General materials	Roll/won't roll; holds sand or water/doesn't hold sand or water; will stack/will not stack; bend/won't bend.

VOCABULARY - SAME/DIFFERENT/NEARLY THE SAME/MORE/LESS/BIGGER/SMALLER/BIGGEST/ SMALLEST
TALL- TALLER - TALLEST SHORT - SHORTER - SHORTEST
LONG - LONGER - LONGEST WIDE - WIDER - WIDEST
NARROW - NARROWER - NARROWEST DEEP - DEEPER - DEEPEST
SHALLOW - SHALLOWER - SHALLOWEST

WILL/WILL NOT IS/IS NOT FITS/DOESN'T FIT
SOME/ALL/NONE/A FEW/A LOT.

ORDERING

Help to the early stages of practical maths and also relevant to order of numbers/letters in words/words in a sentence.

Patterns of objects/shapes
Bead patterns - single repeat and then more complex
Reversals - upside down repeats
Repeat patterns of single objects
Number symbols
Ordering by size.

VOCABULARY COMPARATIVE LANGUAGE OF SIZE
NEXT/NEXT TO/BEFORE/AFTER

COMPARING Size - bigger/smaller taller/shorter wider/narrower
larger/shorter deeper/shallower

Shapes - same/different further round bigger/smaller
more sides/less sides more corners/less corners

Water - Capacity - float/sink full/empty shallow/deep

Weights - heavier/lighter balances

Quantity - more/less/same

Estimating/guessing

continued....,

AWARENESS OF SPATIAL RELATIONSHIPS

Use of large apparatus building bricks, lego, meccano, climbing frame, junk box modelling, mobil toys needing steering around obstacles, P.E. equipment - moving around/over/through. Aware of body size - distances - internal spaces.

VOCABULARY

AROUND/THROUGH/OVER/UNDER/TUNNELLING/HIGHER/LOWER/FITTING TOGETHER/ CLOSE/NEAR/AWAY FROM/UPON/NEXT TO/TOUCHES/FITS INSIDE/GOES OVER/ COVERS/FROM-TO/BETWEEN

BOOK LIST

Early Maths Experience Booklets
Plays the Thing Macdonald 5-13
I do and I understand - Nuffield
Number Work for Infants - A.Thomas - M.Bannister

CAPACITY

Stage 1. - Early Experiences

Play in water, sand, sawdust etc., discovering the properties of pouring materials. Use a variety of containers (not only in shape but also colour), tubes of various diameters, funnels, sieves, sponges, pieces of wood and other objects for experimenting in floating and sinking.

Use the sand wet and dry (is it still a pouring material when wet?). Change the colour of the water or add bubbles.

Develop any situation where water is used:-

painting, baking, house corner, dinner time, watering plants, washing equipment or clothes.

It is important to develop the vocabulary at this early stage and to get the children into the habit of using the correct words.

Stage 2.

Practical experiences to develop the language and understanding of FULL and EMPTY. Use a funnel to fill narrow-necked containers. Note the difference between FULL and NEARLY FULL - EMPTY and NEARLY EMPTY. The term 'nearly empty' will occur later when the children find that a litre nearly fills' the orange bottle. "Why does the bottle hold more than a litre?

Use non-standard units to fill a container

e.g. 6 to fill

Use non-standard units to empty a container.

e.g. fills 6

This stage is easily incorporated into home corner play with cups and a teapot, cafe shops and class parties.

Graphs can be made of the results.

Stage 3.

Comparing the capacity of 2 containers - HOLDS MORE THAN/ HOLDS LESS THAN.

a) Compare by counting non-standard units to fill/empty the containers.

b) Compare by pouring the water/sand from one container to the other.

Ability to estimate the capacity of containers in non-standard units.

Sort containers into two sets:- one set of containers holding more than the beaker, the other holding less.

holds more than holds less than

Find containers with the same capacity.

Stage 4.

Compare the capacity of more than 2 containers - HOLDS THE MOST/HOLDS THELEAST.

a) Compare by using a bottle to mark the levels of water from each container
b) Compare by counting the non-standard units to fill/empty each container
c) Choose own method.

Can they estimate the results?

Stage 5.

Use standard units - litre, ½litre/500ml etc.

a) Compare litre with other non-standard containers.
b) Compare small non-standard containers with 5ml spoon and 10ml container
c) Find the capacity of containers using the standard units

continued ...,

Stage 6

Ability to estimate in litres and ml.
Use standard units in problems involving the four rules of number.

ANGRAM BANK NURSERY/INFANT SCHOOL

An interpretation of "Mathematics Counts" - Report of the Committee of Inquiry into the Teaching of Mathematics in Schools under the Chairmanship of Dr. W.H.Cockcroft (H.M.S.O. 1982).

The Committee met to consider the teaching of mathematics in primary and secondary schools in England and Wales, with particular regard to the mathematics required in further and higher education, employment and adult life generally, and to make recommendations.

PART 1 - This part of the report deals with the reasons for teaching maths and the maths in 1) adult life 2) employment 3) further and higher education.

Implications for teachers - Mathematics teachers have the task of:-

- i) enabling each pupil to develop, within his capabilities, the mathematical skills and understanding required for adult life, for employment and for further study and training, while remaining aware of the difficulties which some pupils will experience in trying to gain such an appropriate understanding.
- ii) providing each pupil with such mathematics as may be needed for his study of other subjects.
- iii) helping each pupil to develop so far as is possible his appreciation and enjoyment of mathematics itself and his realisation of the role which it has played and will continue to play both in the development of science and technology and of our civilisation.
- iv) above all, making pupils aware that mathematics provides them with a powerful means of communication.

MATHS REQUIREMENT FOR ADULT LIFE - A FEELING FOR NUMBERS
MATHS REQUIREMENT FOR EMPLOYMENT - A FEELING FOR MEASUREMENT

ART 2 - Mathematics in Schools

1) .Widespread misunderstanding among the public at large as to the levels of attainment in mathematics which are to be expected among school leavers. G.C.E. & C.S.E. examination results reflect the proportions of school population for whom they are attended, not the overall standard of all children.

2) Parents can exercise a considerable influence on their children's attitudes towards mathematics.

3) Important that parents understand the purpose of mathematical activities and the approaches used.

4) The overall performance of girls in public examinations worse than boys. Suggest that early careers guidance be given so that girls can see the importance of mathematics in many fields of employment.

5) Mathematics is a difficult subject both to teach and to learn. It requires hard work and much practice, whatever one's level of attainment may be and pupils should not be allowed to experience repeated failure.

cont.,

6) Certain things in mathematics need to be learned by heart but not without seeking to develop a proper understanding at the same time.

7) It is not desirable or possible to indicate a definitive style for the teaching of mathematics.

8) Mathematics teaching at all levels should include the opportunities for

a) exposition by the teacher
b) discussion between teacher and pupil and between pupils themselves
c) consolidation and practice of fundamental skills and routines
d) appropriate practical work
e) problem solving, including the application of mathematics to everyday situations.
f) investigation work

Important aspects of primary and secondary mathematics

1) Ability to carry out straight forward calculations mentally.
2) The ability to estimate is important in many kinds of employment and in ordinary activities in adult life.
3) Children should be encouraged to use their own methods of calculating, provided they can do this reliably, after discussion and practical work with appropriate counting materials.
4) Measurement is fundamental to the teaching and learning of mathematics. Stress the importance of 'betweenness' and children should be encouraged, where appropriate, to record measurement in this way.
5) At all stages the teaching of measurement should be based on extensive practical work.
6) Although imperial measures are likely to be with us for some time and children made *familiar* with them they should be encouraged to '*Think Metric*'.
7) 'Back to basics' approach will not assist the development of understanding.
8) Not profitable to think in terms of traditional or modern maths.

POINTS RELEVANT TO PRIMARY SCHOOLS

Broadening of the curriculum has had a beneficial effect both in improving children's attitudes to mathematics and also in laying the foundations of better understanding.

The mathematics curriculum should enrich the children's aesthetic and linguistic experience, provide them with the means of exploring their environment and develop their powers of logical thought, in addition to equipping them with the numerical skills which will be a powerful tool for later work and study.

Practical work is essential throughout the primary years. The measurement of length, capacity, weight, area and time should be part of every child's experience. Practice in measurement needs to be associated with practice in estimation.

All children should have experience of work with a variety of plane shapes and solids.

cont.,

Attention should be paid to methods of presenting mathematical information in pictorial and graphical form.

Logic has its place in helping to notice resemblances and differences, playing by rules and consequence of actions in more complex games.

All children need practical work directly related to everyday-life - to experience situations for themselves.

Number Skills of mental and written computation developed through activities, this includes the four rules and place value.

Children should be helped to attain a secure and rapid recall of addition facts to 10 + 10 (& related - facts) and multiplication to 10 x 10 (& related - facts).

Understanding does not necessarily result in remembering

Important to have plenty of apparatus to help with place value.

Computation of time requires modification of usual computation rules as hours and minutes are based on 60 not 100.

The National Primary Survey backs the belief that children spend enough time dealing with the four rules of number. Many children were spending too much time undertaking repetitive practice of processes which they had already mastered.

In early stages mental and oral work should play a major part in learning. Not be expected to move too quickly to written recording in mathematics.

Parents may exert pressure on teachers to introduce formal recording of mathematics, seeing this as a sign of the child's progress.

Language Essential part in formulation and expression of mathematical ideas.

Needs to refine mathematical language.

All children need as a first stage to develop their understanding of words and expressions of a mathematical nature.

Children should become familiar with the many different ways of expressing the same mathematical ideas.

Teachers should be aware that children use 'verbal cues' to help overcome difficulties in reading all a question. They may pick out key words such as 'more' and 'less' and miss-use the information given.

Language skills should be developed through discussion and explanation rather than the teacher minimising the language used.

Books Even at 16 few pupils are able to learn satisfactorily from a text book. New stages and concepts should be introduced by appropriate oral and practical work, Textbooks can be a source of additional activities and revision exercises. There is a need for more books on everyday life, puzzles and problems.

Mental Mathematics In the early stages mental and oral work should form a major part of the mathematics done. Good mental methods based on understanding of place value and recall of + and x facts. Use to build up speed and confidence in the recall of basic number facts.

Mental mathematics promote the mathematics discussion in the classroom.

Use to introduce mathematical ideas informally. It helps improve the match of child to activities and develop the skills of estimation.

cont..

Problem Solving All children need to apply mathematics they are learning to familiar everyday situations and solution of problems.

Need for more study of children's spontaneous problem-solving activities.

Linking Maths with other Areas Seek opportunity to draw mathematical experiences out of a wide range of children's activities:- Measurement
Symmetry
Environment
Cookery
Rhymes and Stories

When preparing topic and project work necessary to identify the mathematical possibilities which exist within the work.

There is a direct link between science and mathematics.

Use the skills of classifying
counting
measuring
calculating
estimating
recording
making hypotheses and generalisations

Attainment in Mathematics High attaining children should combine more rapid progress through the syllabus with more demanding work related to topics which have already been encountered.

Develop powers of generalisation and abstraction. Need to make specific provision for high attainers.

Low attainment in mathematics can occur in children whose general ability is not low. NB. Failure can be compounded if efforts are made to build further upon a foundation which does not exist.

Advances should be by very small stages with frequent opportunity for repetition and reinforcement.

Attitudes Positive attitudes assist the learning of mathematics: negative attitudes inhibit learning - this may persist to adult life. The child's attitude to mathematics is fixed in the primary years.

Organisation If the same teacher remains with a class for more than one year it may aid continuity of the teaching of mathematics but it may not improve its teaching if the teacher lacks the necessary expertise. Team teaching where a group of teachers are responsible for the children for more than one year provides opportunity of observing the mathematical development over a longer period.

Guidelines for the teaching of Mathematics Kept uder review.

Scheme of work is essential as a basis.

If possible all members of staff should collaborate in the task.

cont.,

Points worth noting

'In arithmetic, I regret to say worse results than ever before have been obtained.' 'The failures in arithmetic are mainly due to the scarcity of good teachers of it' ---- quotes from reports by H.M.I. written in 1876.

Employers are not really unhappy about the numeracy of school leavers and there was little evidence to show that employers found difficulty in recruiting young people whose mathematical capabilities are adequate.

Pam Smith - November 1982.

BECOMING A WRITER

(Schools Council/Kent County Council)

1. Why do I write?

   Important that children see writing as purposeful - it can be quite revealing to ask children why they have to learn to write in school. It is also useful to make your own list of purposes for which you, as an adult, use writing.

2. Links between writing and oral language development - one cannot develop satisfactorily without the other. An assessment of a child's oral language may help to suggest reasons why only poor quality written work is produced

3. The skill of writing

   Stages of development:-

   (a) Teacher-scribe - child dictates to teacher, who writes for the child. Child begins to appreciate that his/her ideas can be recorded in writing without the pressure of having to cope with the writing himself.

   How long should this stage continue? It may be valid to act as a scribe for the child long after she has acquired the writing skills herself.

   (b) Tracing over teacher's writing. Child concentrates just on correct letter formation, without having to worry about spacing, line-follow-on etc. Children need a lot of support at this stage to ensure they learn correct letter formation at this early stage.

   (c) Copying under teacher's writing. This should not begin until correct letter formation is well established, so that child can now concentrate on appropriate size of letters, and spacing between words.

   (d) Copying from separate paper. Same size as child's book - this is important until children can cope with spacing on the page - correct line follow-on, and spacing between lines.

   (e) Sentence or phrase book, teacher supplying most of the words, but child beginning to insert own 'known' words. (It is useful to monitor children's progress by asking them to make a list of the words they know how to write by themselves - set a time limit of say 10 minutes for more able children).

   (f) Personal, alphabetical dictionary, used in conjunction with other materials available in classroom - picture and alphabetical dictionaries, word-banks, etc. Children should be encouraged to be as independent as possible, without constant reliance on the teacher as a resource.

Categories of Writing

1. Fictional narrative

   Essential components:

   (a) central character

   (b) action involving character and others

   (c) resolution of situation created

   Children's fictional writing may take the form of a re-telling of a familiar story, or may be the creation of a completely new one.

Do children show an awareness of the rules of story-writing? Do they compose stories with conventional form? How do children handle characterisation humour, settings in stories?

2. Personal narrative

Much children's writing is presented in the form of 'News' - a recounting of daily events. What is the value of writing such accounts?
Should children be left to write about their personal experiences without help or interference from the teacher?
Letter-writing is another form of personal narrative - is this an art to be fostered in young children, and if so, with what strategies?

3. Impersonal narrative

To write impersonally challenges the young child. He can report and record, but often recounts the experience in a personal way. Yet to transmit information efficiently there is a need to be able to write clearly and precisely without bias or personal feeling intruding.
Recording requires abilities in observation, categorisation, sequencing, perceiving relationships, and an ability to de-centre as you write. What value is there in recording processes and experiences?

4. Poetry

What is meant by the term 'poetry'? Are rhyme and rhythm a basic quality in poetry? How does poetry differ from description? How can participation in experiences help to prepare a child for writing her own poetry?
What literary experiences do young children need in school in order to help them as writers of poetry?

Teaching Strategies

1. Enrichment - through the classroom environment - of the child's vocabulary - by books and poems
2. Exploration - of objects and experiences, both familiar and unfamiliar - of feelings of people, both real and imagined
3. Focusing - honing in on a choice of topic, or an aspect of an experience
4. Sequencing - in story-telling - by examining processes - through the use of apparatus.

Evaluation

What to we need to know about a young writer in order to evaluate effectively?
Should a teacher ever ask a child to revise or re-write?
Is there a case for looking back at a child's work with him? How often?
What are some of the ways a child's writing can be used in order to help him understand the purpose and value of writing?

A. V. KERSEY   JULY, 1983

SCIENCE IN THE NURSERY

The nursery is concerned with many areas of development and learning.

One is the acquisition of the social skills of communication and behaviour without which a child is severely handicapped in his progress through school and indeed in adult life.

A nursery however, needs to be structured so that cognitive as well as social and physical development are fostered. There is concern for the development of early reading, writing and mathematics, (pre-reading etc.) Mathematical concepts are very often closely related to science. Reading, which is a form of communication, is essential to the overall curriculum. A specific reading skill related to science might be the use of reference books. Effective reference skills begin in the nursery.

A further area of interest is the development of good attitudes to learning in all fields but these do have a clear relevance to effective progress in the field of science.

Curiosity must be fostered on a more than superficial level. Perseverance to satisfy initial curiosity and to follow it through is necessary. This involves sensory experiences of looking, handling and touching (see attached list). It involves experimenting with change and with cause and effect (young children are quite prepared to spend considerable time on working out an idea). It involves the teacher being available as a 'learning resourse'. She provides a listener, a source of information, someone with whom to exchange ideas or to help to clarify ideas. It involves using books. This may be a simple picture book or it may be quite an advanced book used with the help of the teacher. Many strands of learning are interwoven here.

Careful observation needs to be encouraged, together with the ability to record observations accurately and in detail and also in imaginative and creative ways which may go far beyond the reality. In the nursery this recording will take the form of spoken language and two dimensional or three dimensional representation. It cannot be over-emphasised that a mastery of these concepts and techniques is essential to later development.

The teacher's role is to encourage observation. She must be aware of when to intervene in an activity by asking a question to focus attention on a particular aspect, by suggesting a new line of enquiry, by introducing specialised vocabulary. She must allow a child to practise the language skills of reporting, describing and reasoning and to extend these skills by her own response. She must respond sensitively to the pictorial recording by showing that she values it, sometimes by putting into writing the child's comment or story.

It is hoped that children will be creative, inventive and original in their approach to science. The activities set up by the teacher are designed to encourage this. (see attached list).

If we want children to wonder 'why' and 'how' and 'what if' in other words to criticise and question, then we must provide a classroom which is stimulating and challenging and we must encourage an awareness of the world round about. (see attached list.)

I believe that we badly underestimate the ability of nursery age children if we do not provide adequately for cognitive development. We must accept that children of this age have a tremendous thirst for knowledge provided it is based in the first instance on their practical experiences and interests. These 'interests' are incredibly varied and wide-ranging. What do we do to them to stifle it all?

The activities are designed to foster development in many areas. Learning which may be related to science has been particularly noted and appears rather artificially out of context.

The important objective is to provide children with a body of concrete experiences from which they can learn to make judgements, to reason, to discriminate and to select. A body of knowledge is also built up in a meaningful way.

The particular details listed apply to nursery age children and will be extended and developed later.

Sand (dry): qualities - pours like water - flows through a sieve (different meshes, shapes) - cannot be moulded - difficult to control - won't mould but can be built in "hills" - gradients - texture - tickly, rough, abrasive - source - sandstone - rocks hard and soft.

Sand (wet): add some water - change - texture - soft, clingy - can't be poured - can be moulded - held in the hand.

Sand (wet): add a lot of water - change - sloppy - runs - spreads - does it pour - action of grains if left in vessel - what has happened to the water when sand dries out - how long does it take - condensation.

Paint: Only primary colours supplied - children mix from dry powder on a pallette.

1) add lot of water - runs - thin pale colour - how does it act when applied to paper.
2) add little water - thick colour - easier to control - action on paper - texture - applied thinly - applied very thickly.
3) how much water is best - for what purpose - effect of variety of brushes, fingers.
4) colour mixing - how different colours "made" (blue/green = yellow) - how are different shades achieved - darker - lighter.

Water: difficult to control - flows - pours - siphons - ways in which absorbed - sponges etc. - paper - disintegrates - colour changes - immersion (pebbles) soaking - materials - water wheel (driving force) - dyes to change colour - washing up liquid (bubbles) - blowing bubbles through tube - cause - colours - reflection - waves.
Weather - rain , snow, ice - freezing and thawing - puddles - drains to remove water. Essential for plant and animal life.
Floating and sinking - wood - does largest piece always sink, small piece always float - balance (using boats etc.) - floating on air.

Magnets: (types - bar, disc, horseshoe) - which materials attracted - magnet also repels - working through a surface (e.g. table top) - forming a chain of small objects (nails, paper clips) - is biggest always most powerful.

Bulbs and batteries: only simplest connections possible for this age group due to difficulty of manipulative control but handling and understanding of circuits built by older children quite possible - need for two terminals - length of life of bulb and battery - linking.

Mirrors, light and colour: convex and concave - images- distortion - reflections, symmetry - prisms - rainbow - colour paddles - kaleidoscope - shadows - sun dial.

Patterns: patch paintings, symmetry (paper folding) - printing (commercial materials giving mainly geometric patterns) - natural materials giving mainly random shapes - comparing - extending - why veins in a leaf, rings in a vegetable - rubbings - walls, manhole covers etc. - collecting, sorting shapes.

continued....,

Wood: bark, sections - different appearance, texture, colour, pattern on bark - size - matching and identifying leaves, fruit (use of reference books) - wood which has been weathered, on the ground, by the sea - link with minibeasts - food and shelter - found in rotten wood as well as living trees - wood for our use - identifying around school.

Rocks and minerals : colour - texture - comparison - differences (minerals) galena, iron pyrites, gold!! - crystals - colour and shape, quartz, calcite, amethyst, sulphur (small) - formation in cavities - examination under microscope or magnifying glass - beauty in natural forms.

Fossils: examin ing shapes and patterns - origin - plant or animal - formation.

Bones: mammals - birds - some human bones - function, strengthen and support the frame - internal structure - movement of joints - jaws - types of beaks and feet for different purposes.

Springs and spirals. man made spirals - springs (very large, very small) - natural spirals - shells, fossils, snail shells, plants - growth.

Cogs gears, pulleys: movement- interlocking - driving - lifting.

ANGRAM BANK NURSERY INFANT SCHOOL

OBJECTIVES - Science in the Infant School.

Objectives

Science in the infant classroom is very much interwoven into the activities that normally go on there, it is indistinguishable as a separate activity and the objectives relate to much more than what could be called "scientific ideas".

Developing attitudes, interests and aesthetic awareness

Willingness to ask questions.
Willingness to handle both living and non-living material.
Sensitivity to the need for giving proper care to living things.
Enjoyment in using all the senses for exploring and discriminating.
Willingness to collect material for observation or investigation.

Encouragement of observing, exploring and ordering observations

Appreciation of the variety of living things and materials in the environment.
Awareness of changes which take place as time passes.
Recognition of common shapes.
Recognition of regularity in patterns.
Ability to group things consistently according to chosen or given criteria.

Developing basic concepts and logical thinking

Awareness of the meaning of words which describe various types of quantity.
Appreciation that things which are different may have features in common.

Posing questions and devising experiments or investigations to answer them

Ability to find answers to simple problems by investigation.
Ability to make comparisons in terms of one property or variable.

Acquiring knowledge and learning skills

Ability to discriminate between different materials.
Awareness of the characteristics of living things.
Awareness of the properties which materials can have.
Ability to use displayed reference material for identifying living and non-living things.

Communicating

Ability to use new words appropriately.
Ability to record events in sequence.
Ability to discuss and record impressions of living and non-living things in the environment.
Ability to use representational symbols for recording information on charts or block graphs.

Appreciating patterns and relationships

Awareness of cause/effect relationships.

Interpreting findings critically

Awareness that the apparent size, shape and relationships of things depend on the position of the observer.

Science lies in the work we already do. It is hoped that the teacher will see links between their classroom activities that they have not seen before and be able to make them of deeper significance both to the children and themselves. It is hoped staff will also see their work in a better relation to a continued education for children.

M.E.I. March. 1983.

ANGRAM BANK NURSERY INFANT SCHOOL

SCIENCE IN THE INFANT SCHOOL

> "There is no need for a teacher to know all the answers; the scientific attitude involves finding out, and is not concerned at this level with learning sets of facts, or formulae. Science needs curiosity, care and common sense. These, rather than telescopes, are what makes activities scientific, and these can be developed with any age group"
> Teaching Primary Science.

Science in the infant school is mainly concerned with gathering experience. School should make a conscious intention to:

1) set children thinking rather than learning by heart
2) encourage children to learn through activities
3) be aware of the age stages at which children are able to deal with specific ideas and facts in science
4) organise provision of many child sized experiences from which each child can build up a genuine comprehension of important scientific concepts

In general, science is not isolated from every day things, and schools must ask whether the topic is seen by children as relevant to their lives. Facts learned at the first school stage, however useful, are much less important than activites and attitudes.

We can ask: Will the children be interested?
Will they be able to understand?
Can they be given enough experiences to build up basic concepts for themselves?
Will they want to go on?
Will the activities and our backing help them to think and act scientifically?

Being scientific involves observing carefully, thinking about what one observes, making sensible guesses based on observations, testing these guesses to see if they work, changing the guesses if they don't work, and in general, trying to think logically. Can we help children to achieve these goals?

These steps need to be taken logically. Children of any age can begin on these lines.

The early stages of science involve seeing what happens - learning about real materials from the materials - not from books or people.

Children need concrete experiences together with guided discovery - asking questions:

"If we do this, what is likely to happen?"
followed by "Does it happen?"
"If we want this to happen, what can we do which might make it happen?"
followedby "Does it work?"

What are the special reasons for making displays and exhibitions in science work?

1) Because science deals with real things - children in the infant school are still in the concrete stages of development, and need real things in order to understand about them.
2) A display or exhibition can provide motivation for children to practise scientific skills. Many children learn a lot from visual stimuli, and can get help from others in doing so, although they may take in nothing from looking at text.

continued...,

3) The display is a source of real material for exercises in mathematics and science: for observation, identification and recognition; for comparison, grouping and classification, for the discovery of patterns. Measurement and arrangement in series may be relevant, while opportunity for extensions into art, creativity and writing should be available and encouraged.

4) Setting up a class or group display involves communication - a stimulus to class members and outsiders.

5) The display creates a focal point of interest to which children can contribute and feel part of the environment and add personal interest.

What kind of science is right for children? What do we want them to achieve through learning about science?
How can we best help them to achieve?

Exploration of the environment is certainly involved - the examination of what is there. There may be experimenting, there may be measuring, but much of the work will be finding out.

What ways of finding out or of exploring are suited to infant children?
We can help children gather appropriate experience of their environment: we can help them to ask their own questions and find their own answers by first hand investigation as far as may be. They will organise their experiences into some pattern personal to themselves and we can help them to do this through discussion, but we must be careful that our own ideas about science and what they might achieve through it do not dull our perception of the individual natures of these children and what they need to develop their different potentials.
For instance, part of science is concerned with ordering experiences into a structure and extending that structure by making hypotheses about causes and effects which then/we proceed to look for. This is fine, but if in our work with children our hypotheses and our examination of cause and effect lead us to make generalizations that depend upon abstractions, we shall have done no service to those children who cannot yet think in the abstract. (i.e. infant children). For them we had far better stick to actual things and properties we observe that those things have.

What do we want children to achieve through science?
Much of what we want them to achieve through science will be similar to, if not the same as, what we hope they will achieve through work in other subjects.
The aims we have in the infant school are of a very general kind, but others can be added to them that are sufficiently specific for the purpose.

How can we help them achieve their own potential?

1) Children should be helped through investigations to gather experience of their environment and where appropriate, to organise it themselves into small areas of development to be joined up later.

2) It is possible to pursue such a cause profitably, guided by suitable objectives, so that individually and in groups children work at their own pace and at their own level.

3) Attitudes of enquiry, objective judgement, personal responsibility, ability to work independently and organise one's own work can be established in children at an early age, though the subject-matter through which these attitudes are encouraged may well not be pre-arranged in detail by the teacher.

M.E.I. March, 1983.

SCIENCE IN PRIMARY SCHOOLS

(A Discussion paper produced by the H.M.I. Science Committee 1983)

Paper offers comments on the variety of ways in which children of primary school age can be taught to think scientifically.

1) Science and the curriculum

Science with its emphasis on the study of the environment and concern for direct observation and practical investigation matches what we know of how children best learn. It can assist pupils to bring questioning minds to their experience of things around them. The teaching of science in primary schools should seek to develop the processes of scientifica thinking such as:

observing explaining communicating pattern seeking
experimenting applying

Observing does not mean simply looking and recording. - It means being alert to the many features that may be observable and not only those that are most obvious. Explaining observed pattern of events is an important part of true scientific activity.

Sometimes experimentation is necessary to help children arrive at a clearer idea of an explanation.

Scientific facts and principles are capable of expression in a variety of ways - in speech, writing, pictorially or graphically, or by use of number or mathematical relationships.

Content of science

Teacher must be clear about which scientific concepts are to be used or developed in any particular piece of work so that it may be appropriate to the age and development of children. Some scientific ideas call for a carefully chosen sequence in what is done if concepts are to be thoroughly grasped and progress is to be made.

Aspects of science that children should meet in primary school include:

The study of living things and their interaction with the environment
Materials and their characteristics
Energy and ints interaction with materials
Forces and their effects

Approach can be made through a variety of activities but it is important to understand which part of the activity contributes to the science and at what level.

Systematic enquiry

Preparation of activity important. Teacher and children need to know what is to be studied during the activity and sufficient follow up necessary to ensure learning.

(Eg. 1) Children looking at birds. - It is easy for pupils to do a great deal of work on birds with almost nothing that could be called scientific being included. A systematic enquiry might involve looking not only at the birds themselves but at their mode of living; investigating their food preferences and the way they are adapted to their habitat; it might include comparisons between birds of different types, different habits and different distributions geographically and numerically. Explanations might be sought.)

(Eg. 2) The building of a model bridge is not in itself either scientific or technological; but scientific and technological development is taking place when a sustained investigation is being made of forces and structures, when pupils are asking questions and seeking answers through experiment or in books.)

cont.,

Teaching and learning

For science to be taught effectively teachers must have an understanding of its requirement and a knowledge of its content, particularly of those facts and concepts that are of fundamental importance. Teachers also need to understand the importance to science of experimental investigation.

The ideal in learning is achieved when children are led through a rich variety of experience while along the way the teacher is able to extract, exemplify, reinforce, clarify and relate ideas and knowledge so that pupils are provided with education that forms a whole, although they still understand and gain from separate parts.

It is perfectly proper to make small beginnings with teachers taking some of the science content they feel most confident about and at the start, organising the children's investigation and learning in a fairly formal way.

Experience brings confidence and encourages expansion.

Links with other subjects

Important relationships exist between science and other areas of the curriculum - eg. development of language, discussion, reading, writing, mathematics, physical education - based on first hand experience.

2) Continuity and Progress

Apart from English and mathematics, continuity in the primary curriculum has been subject to much neglect. Science suffers at least as much as other subjects, and perhaps more than some, from discontinuity.

Science covers a vast and ever-increasing field of human activity but at the same time there are fundamental aspects that must be understood by every pupil, although not necessarily pupils at the same age, if they are to make progress.

Sometimes teachers are unaware of the work pupils have covered in the previous year or that they are likely to cover in the succeeding year. Schools often have no general scheme of work for science.

It is important for teachers to know in detail the range of the work already encountered by each pupil in science, the level at which it has been tackled, and how successful he/she has been in mastering the ideas and knowledge involved. Every school record should contain information on these three aspects of each pupil's science education.

Transfer between schools

A change of school for pupils often results in significant changes in the curriculum pattern, modes of learning and teaching, staffing and resources. The effects of such a break upon pupils are commonly deplored, but often attempts to encourage curriculum continuity have relied on limited information passed by record cards from school to school. Very few secondary schools, especially if their intake is drawn from a large number of primary schools, can rely on any degree of common science experience on the part of their new pupils. The inevitable response is to behave as if the pupils had received no science education before entering the school. Detailed assessment and recording of science in the primary school can help to improve this situation. If science teachers in secondary schools know what science has been done, what concepts have been met, what knowledge gained, and what skills practised, they will find far less justification to ignore or under-value their pupils earlier experience. There seems to be no good reason why the primary schools in a given area should not institute some simple co-operative procedures over science.

cont..

Co-operation, whether between teachers in one school or in a number of schools, is indispensable to continuity and progress. It is not difficult to arrive at a concensus on basic science education for primary schools. Little, if any, educational freedom is surrendered by doing so and the gain for both pupils and teachers is considerable.

Constructing a scheme for work

The benefits of a well constructed scheme of work can hardly be over-emphasised.
Emphasis should be on progression in concept, content and intellectual demand; it should contain not only lists of topics but advice on suitable approaches, on practical work that has been found successful, resources that are available within the school and outside it, on ways in which work on science topics might be extended and the pitfalls to be avoided. There should also be a clear indication of the assessments to be made of the pupil's development and the methods to be used.

In considering the structure of a scheme of work there are a number of factors to be borne in mind. Young children ask many questions, and are highly motivated if they are pursuing investigations that arise from their own interests. There is much to be said for basing work upon these questions, but it is difficult to teach science this way all the time

A strong case can be made for deciding upon some common content and for devising a scheme of work that prescribes content, appropriate to their abilities. Whatever the science they are doing, children should be involved in observing, investigating, experimenting and predicting, they should also be using their science in technological activities that present real-life problems to be solved and things to be designed and made.

A properly constructed scheme of work presents problems - how to decide upon content; possible lack of flexibility, would staff be aware of new developments if working closely to the scheme.

Criteria for selecting content

1. Content should, wherever possible, be related to the experience of the children.
2. It should be in accordance with their stages of development, provide them with knowledge and understanding of scientific ideas to help them to understand their own physical and biological environments and to understand themselves.
3. It should, where possible, lay the foundations for a progressively deepening knowledge and understanding of scientific concepts and facts that will be useful to them as future citizens.
4. It should include examples of the application of science to real-life problems including those of technology.

3) Development of Scientific Ideas

In considering the progression of a particular aspect of science, it is helpful to look forward to an end point. What is it that a particular pupil might be expected to know about a particular topic by the time he or she is ready to leave the school? What additional ideas might be met, first, by the brighter and second by the brightest pupil? It is important to remember that scientific skills have to be practised and this must take account of the children's development. Part of the role of the teacher is to ensure that there is progression in the development of scientific skills and thought processes as the children make their way through the school.
(see examples of statements P. 9, 10, 11)

cont.,

4) Children's Work in Science

(This section looks at what kind of work goes on in schools and how some teachers make a start on scientific work in their classroom is illustrated in examples).

5) Organisation and Staffing

The evidence from the visits to schools by H.M.Inspectors indicates that in general science in primary schools falls far short of the level of effectiveness which is often claimed for it. The H.M.I. report Primary Education in England 1979 found that few primary schools visited had effective programmes for the teaching of science. More recently the A.P.U. reports have shown that although few schools admitted to no science, few gave more than five per cent of the time to it.

If the whole curriculum is to be well taught, heavy demands have to be made upon individual class teachers, who are expected to tackle a variety of subjects, in some of which they may have a very limited academic background. It might be asked whether it is reasonable to expect all, or even most teachers to teach science without support of a kind and quantity that is wholly lacking at the present time. Many teachers who attempt to teach science fail to understand its nature and requirements. Heads can capitalise on the specialisms of the staff. All schools would benefit by a well constructed programme of in-service training.

A new status must be accorded to science teaching. The subject has much to offer to general educational development in the context of a broad curriculum which receives favourable mention in the H.M.I. Survey previously mentioned.

Children need experiences that lead their thinking from the concrete and particular towards more generalized knowledge and concepts through steps appropriate to their understanding. They need to be able to test ideas through suitable practical work, to be guided along productive pathways and steered away from unproductive ones. Probably it is best to vary the style to meet demands of the occasion, with individual work, class teaching, group work or demonstration each playing a part.

6) The Role of the Head

The first requirement is for all the teachers to be brought together for discussion during which the head's views are clearly outlined. The policy would need to be formulated in such a way as to enlist the teachers' help in its creation. Teachers should realise that the initiative for developing science is as much their own professional responsibility as it is that of the head. Any agreed policy statement should be subject to continuous evaluation as ideas were tested in practical and resources were established. Evaluation of the effectiveness of science in the curriculum is important.

Teachers should consider:
a) what processes and what content is appropriate for them to teach and for the children to learn, and the balance , content and process
b) how to ensure a sensible progression in any area of content.
c) how best to organise their classrooms.
d) their own roles, their attitudes and knowledge
e) their own in-service needs and the amount of help and support available

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